A Database Publication

THE MICRO USER

Volume 7
Number 6
August 1989
£1.50

Top-selling guide to the BBC Micro, Master, Archimedes and Z88

BODY BUILDING

Overheating? Here's a really simple cure

THE A3000

Two views of Acorn's new BBC Micro

OVERLAYS

How to use sideways ram to hold routines

UTILITY

Handy date validation for your own programs

TELETEXT

Monitor page changes when they happen

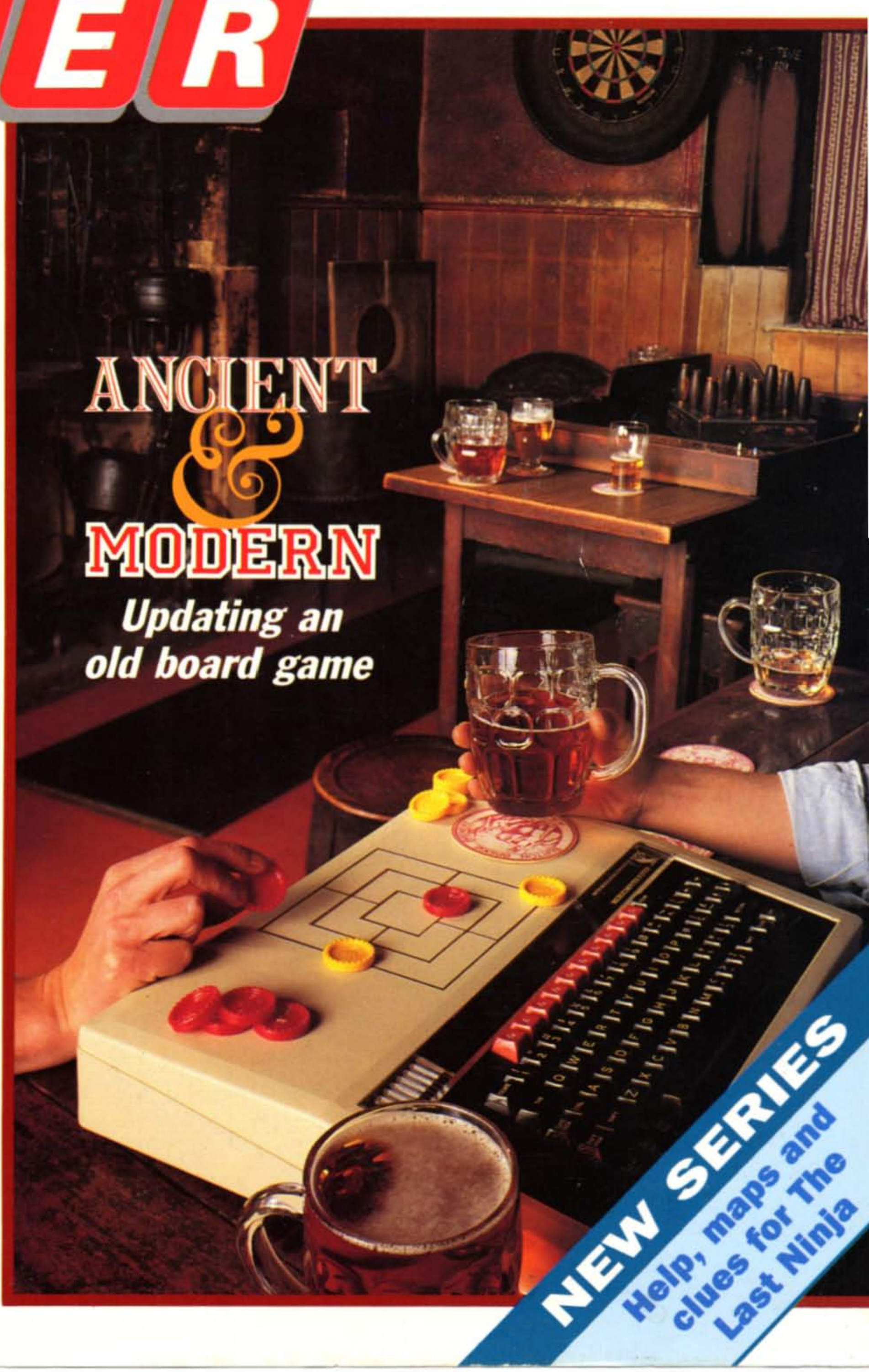
TYPE-IN GAME

Can you wipe out the devil in The Gate?

REVIEWS

- Punctuate!
- Film Maker
- Designer Castles
- Wasp
- Water Game
- Studio 24

. . . plus all the latest games



ANCIENT & MODERN

Updating an old board game

NEW SERIES

Help, maps and clues for The Last Ninja

MACH TECHNOLOGY

The MACH-286

DATACOPY
Imagination Series
OCR plus
PageMaker
Microsoft Word
Microsoft
PHILIPS
RANK XEROX
Xerox Ventura Publisher
GEM Draw Plus
DIGITAL RESEARCH
Adobe Illustrator

for the Archimedes
IBM compatible, 80286 processor, MS-DOS
£299 (excl VAT)

MACH TECHNOLOGY LTD
75 HYDEWOOD ROAD, LITTLE YELDHAM, ESSEX CO9 4QX
Tel: (0787) 238125 Fax: (0787) 238114

For fast delivery telephone your order on 01-205 9558 using VISA/Access Card

BARCLAYCARD VISA

Orders welcome from government depts & educational establishments

TECHNOMATIC

Techno House 468 Church Lane, London NW9 8TQ.
Tel: 01-205 9558 Fax: 01-205 0190

All prices ex VAT
Prices are subject to change without notice
Please add carriage
(a) £8.00 (Courier)
(b) £3.50
(c) £1.50
(d) £1.00

Archimedes, Computer Systems

All Archimedes systems are fitted with new RISC OS systems.

Model	Base	Colour
A3000	£649	£849
310	£899	£1099
410/1	£1199	£1399
420/1	£1699	£1899
440	£1929	£2129
440/1	£2499	£2699
PC Emulator	£60	

Carriage £12/system £8/computer

*For the colour system we offer a choice between Acorn Colour Monitor (Philips CM8533) and Philips CM8833 with RGB/RGBi and Comp Video input and stereo sound facility.

*Every 440 System will be supplied with Acorn Developers Toolbox and a PC Emulator or First Word Plus at no extra cost.

Technomatic Special Deal

To get you going on any of the above Archimedes systems you purchase from us, we will contribute 10% of its cost towards any additional hardware or software purchase you make from us or to pay for extended finance if you require the facility.

The following MultiScan Monitors can be supplied at special prices when purchased with a computer:

TAXAN 770+	£425(a)
MTS9600	£375(a)
CM1686 16"	£1499(a)

(for the extra HiRes modes on 400 series)

Extended Finance

We can offer extended finance for 11 months under our special offer detailed above or for 24/36 month period at 12.75% (approx APR 26%). Please send for details. Technomatic is a licensed credit broker.

EXPANSION SYSTEMS

RISCOS (305/310/440)	£29(b)
Fitting	£10
1Mb RAM upgrade (410/420)	£169(c)
3Mb RAM upgrade (410/420)	£499(b)
1Mb RAM upgrade A3000	£169(b)
3.5" Int Drive Upgrade (please specify 305/310 or 410)	£118(b)
External Drive Adaptor	£30(c)
External 5.25" Drive with psu (40/80T)	£90(b)
Acorn 20 Mb Upgrade (305/310)	£449(a)
Techno 20Mb upgrade kit (410)	£199(a)
Techno 40Mb upgrade kit (410)	£349(a)
Techno Ext HD upgrade	POA
Acorn Backplane (2 slots)	£37(c)
TechnoLog Backplane (4 slots)	£39(c)
Fan for TechnoLog	£8(d)
Acorn ROM podule	£51(c)

We have a large range of expansion cards in stock please send for details.

MULTI I/O Podule

A low cost card provides: **Video Digitiser, Sound Sampler**, a full RS232 interface, 3 ROM skts & Joystick interface. **£107(b)**

Archimedes SOFTWARE

LANGUAGES & PROG. TOOLS

ANSI C/ISO PASCAL/ FORTRAN 77	each £95(c)
PROLOG X/LISP	each £175(b)
TWIN Editor	£27(d)
Archimedes Assembler	£185(b)
Software Dev. Toolbox	£185(b)
RISC BASIC Compiler (SV)	£85(c)
Chares Toolkit	£32(d)
Clares Toolkit+	£41(d)

WORD PROCESSORS

First Word Plus	£79(c)
Graphics Writer	£27(d)
Pipedream	£89(c)
Pipedream Spellchecker	£43(d)

SPREADSHEETS

Logistix	£95(c)
Sigmasheet	£57(c)

ACCOUNT SYSTEM

Minerva's Suite* (Order Processing/Sales Ledger/Stock Manager/ Purch. Ledger/Nom. Ledger)	each £54(d)
Home Accounts	£41(d)

**Requires System Delta plus*

EMULATED PACKAGES

VIEW/Viewsheet/Viewstore	each £47(d)
Interword/Intersheet	each £35(d)
Wordwise	£20(d)

GRAPHICS/ART/CAD

Pro Artisan	£137(b)
Artisan	£30(d)
Artisan Support Disc	£17(d)
Auto Sketch	£69(d)
Gamma Plot	£57(d)
Render Bender	£65(d)
Presenter	£24(d)
SVARC-PCB	£167(b)
SV Solid CAD	£41(d)
SV Super Dump	£207(d)
Sv Real Time Solids Modeller	£75(c)

GAMES

Hoverbod/Missile Control	each £12(d)
Orion/Freddie's Folly	each £12(d)
Zarch	£15(d)
Conqueror	£24(d)
Enthar Seven	£29(d)
Minotaur	£9(d)
Clares 3 Games Pack	£12(d)
Thundermonk	£12(d)
Corruption	£20(d)
Pacmaria	£16(d)
Terramex	£16(d)

DATABASES

System Delta Plus	£57(c)
System Delta Plus Prog Ref Manual	£25(d)
Reporter*	£33(d)
Mailshot*	£33(d)
School Administrator	£125(b)
Alphabase	£37(d)

**Requires System Delta plus*

MISCELLANEOUS

PC Emulator	£79(d)
HEARSAY Comms Package	£55(d)
MAYA Terminal Emulator	£49(d)
Control (setup utility)	£13(d)

Ex-SERVICE EQUIPMENT

Our Service department has a number of disc drives, monitors and printers available for sale at reduced prices. Please send for detailed list.

MASTER SERIES

AMB15 Master 128	£439(a)

The Master package includes: *View Word processor and Viewsheet spreadsheet software and EITHER Educational/Fun software bundle with STARdataBASE package OR A 200K 40T DS single drive TS200. Please specify your choice.*

ADC06 Turbo 65C102 Module	£115(b)

Technomatic is a Acorn Authorised Econet Referral Centre. We carry a full range of Econet Accessories in stock.

DISC DRIVES

400K/640K per mechanism (all drives)

5.25" Double sided (40/80T Sw):

TS400 Single	£80(b)
PS400 Single with psu	£90(b)
TD800 Dual	£160(a)
PD800 Dual with psu	£170(a)
PD800P Dual with psu plinth mounted	£185(a)

3.5" Double Sided

TS351 (5.25")	£69(b)
PS351 (5.25" Case + psu)	£95(b)
TD352 Dual	£126(a)
PD352 Dual with psu	£139(a)

Combo Drives 5.25" + 3.5" & psu

PD853	£170(a)
PD853P plinth mounted	£190(a)

WINCHESTER DRIVES

P30HD 30Mb Hard Drives Other sizes available	£410(a)

PRINTERS

EPSON

LX800	£165)a)
LQ500	£265(a)
FX850	£295(a)
LQ850	£415(a)

STAR

LC10	£169(a)
LC10 Colour	£215(a)
LC24-10	£275(a)

NATIONAL PANASONIC

KXP1081 incl master lead	£139(a)
KXP1124	£269(a)
Integrex Inkjet Colour	£515(a)
Hitachi 672XD A3 Plotter	£479(a)

This advertisement can only show an example of the range of products stocked by Tchnomatic. So send for our latest BBC catalogue providing detailed information and prices on BBC Computer Systems, Peripherals, Software and Books. To obtain your free copy please complete and return the coupon below.

Technomatic is an authorised BBC Computer and Econet Referral Centre providing a professional and reliable service to the BBC user.

NAME..

ADDRESS ....

....

.... Post Code ....

8/89

Return to Technomatic Ltd, Techno House, 468 Church Lane, London NW9 8TQ.

THE MICRO USER

Managing Editor
Derek Meakin

Features Editor
Peter Davidson

Deputy Features Editor
Steve Turnbull

Production Editor
Peter Glover

News Editor
Don Lewis

Technical Editor
Mike Cook

Promotions Editor
Christopher Payne

Promotions Coordinator
Robin Nixon

Reviews Coordinator
Pam Turnbull

Advertisement Manager
John Snowden

Advertising Sales
Peter Babbage, Gail Blincow
Richard Gingell

Assistant to the
Managing Editor
Alan McLachlan

Tel: 0625 878888 (All depts.)
051-357 2961 (Subs.)
Telecom Gold: 72:MAG001
Telex: 9312188888 DB
Prestel Mailbox: 614568383
Fax: 0625 879966

Published by:
Database Publications Ltd,
Europa House, Adlington Park,
Adlington, Macclesfield SK10 4NP.

Subscription rates for
12 issues, post free:

£15 – UK
£25 – Europe (incl. Eire)
£31 – Overseas Surface
£42 – Overseas Air

ABC 59,727
Jan-June 1986
ISSN 0265-4040

The Micro User welcomes program listings and articles for publication. Material should be typed or computer-printed, and preferably double-spaced. Program listings should be accompanied by cassette tape or disc. Please enclose a stamped, self-addressed envelope, otherwise the return of material cannot be guaranteed. Contributions accepted for publication will be on an all-rights basis.

© 1989 Database Publications Ltd. No material may be reproduced in whole or in part without written permission. While every care is taken, the publishers cannot be held legally responsible for any errors in articles, listings or advertisements.

The Micro User is an independent publication and neither the BBC nor Acorn Computers Ltd are responsible for any of the articles in this issue or for any of the opinions expressed.

News trade distribution: Diamond Europress Sales & Distribution, Unit 1, Burgess Road, Ivyhouse Lane, Hastings, East Sussex TN35 4NR. Tel: 0424 430422.

Database Publications is a division of Europress Ltd

Regulars

7 **News**
All the latest events in the ever-changing world of your BBC Micro.

14 **Ceefax Guide**
What's coming this month on the telesoftware pages of BBC TV.

25 **Body Building**
Mike Cook keeps his cool and describes his latest slimline fan.

28 **Mad Hatter**
A regular monthly look at adventure games – old, new and revamped.

34 **Hac Man**
A wealth of useful hints and news from our resident games expert.

61 **Problem Solved**
A helping hand with some of those mind-testing hardware problems.

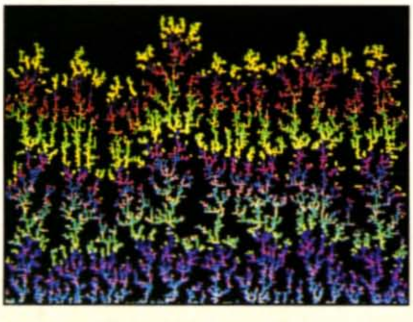
111 **Letters**
The chance to get your news, views, moans and name into print.

Series

22 **Sprites** ✱
More ways to move and stop screen objects in our tutorial.

47 **Wimps** ✱
The series continues by showing you how to re-size the windows.

52 **Fractal Magic** ✱
We reveal more new and natural depths in this area of micro maths.



65 **The Last Ninja**
A helping hand giving maps and clues to this challenging quest.

Feature

41 **The A3000**
Two experts view the new BBC Micro from very different angles.

Games

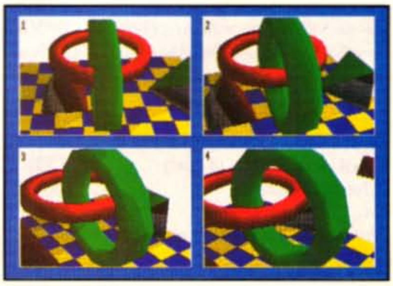
20 **Merrills** ✱
A popular ancient board game brought up to date on your micro.

50 **The Gate** ✱
Can you get rid of the demon in this action-packed arcade game?

Reviews

31 **Software Scene**
Our reviewers cast their eyes over the very latest games releases.

55 **Studio 24 Plus**
We take a look at the latest music designer for the Archimedes.



99 **Film Maker**
Make movies with 3 dimensional animation on your Archimedes.

Utilities

38 **Date Analysis** ✱
A neat way to solve the problem of untidy date validation techniques.

103 **Overlays** ✱
Write bigger Basic programs using sideways ram to hold the routines.

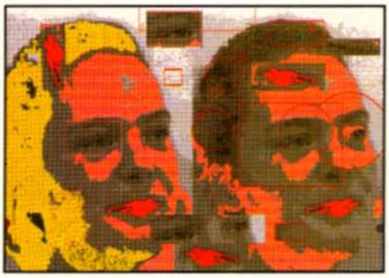
105 **Keeping Track** ✱
Get an audible warning each time a teletext screen display changes.

Education

69 **Update**
Up-to-the-minute news of the BBC Micro in the world of education.

70 **Education Reviews**
Looking at the best in software for the BBC Micro series in schools.

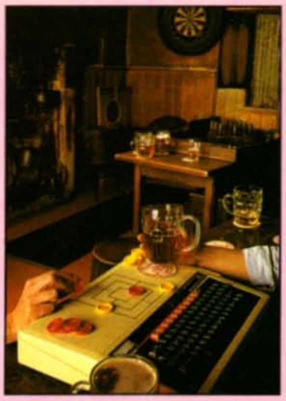
77 **Econet**
How networking in a school is helping to improve work quality.

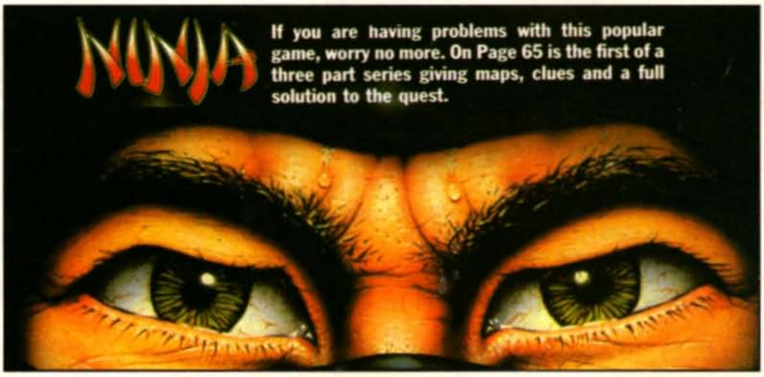


80 **Pro-Artisan**
Some practical applications of this superb graphics package.

Cover story

Known by several different names throughout the world – Nine Man's Morris and Mill to name just two – Merrills is probably one of the oldest board games around. It can be played with anything from shells on a board drawn in sand to corks on a beer barrel. Now it's brought right up to date with our BBC Micro implementation on Page 20.

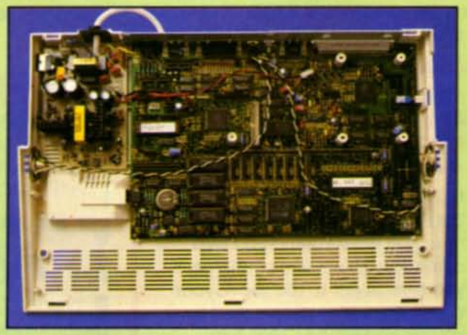




If you are having problems with this popular game, worry no more. On Page 65 is the first of a three part series giving maps, clues and a full solution to the quest.

The newcomer: Acorn's A3000 explored . . .

Our resident hardware expert takes the lid off Acorn's latest micro and evaluates what's inside. And we give the machine to a micro expert with very little experience on a Risc machine. Does it live up to its BBC Micro badge? Turn to Page 41 for full details.



MICRO USER CLASSIFIEDS

The best bargains in the world of the BBC Micro come from fellow readers of *The Micro User*. Turn to **Page 122** to find just what you're looking for – from cheap modems to complete computer systems.

✓ **For full details of how to use the Checksums, see the article on Page 48 of the February 1989 issue of *The Micro User*.**

✱ **The Type-it-in symbol indicates that the feature contains at least one full length listing for you to key in on your micro.**

Next month in THE MICRO USER

Utility
Highlight errors

Crystal Sea
Fast action game

Flick Book
Fascinating animation

Evaluation
The best sort of sort

THE Archimedes A3000

FREDDY'S FOLLY
RISC OS

The New BBC Micro A3000

Beebug are pleased to offer the new BBC Micro, from Acorn Computers. It is ideal for home, education and business use and includes RISC OS, the new multi-tasking operating system. With the PC Emulator it will also run over 90% of DOS Software, including MS Word, Wordperfect, Dbase III, Lotus, etc.

AVAILABLE July 21st

The A3000 will be available in limited quantities from July 21st, when it will be launched at the Acorn User Exhibition, Alexandra Palace. Demand for the A3000 is very high, so if you wish to be one of the first to own one, you should reserve it now.

GUARANTEE

Beebug have over 7 years experience of providing support on the original BBC Micro. If you need help, you can rely on us, in addition to your full 1 year warranty on the A3000 itself. Our prices are competitive, but if you can get a better deal on the A3000 we will match it.

2 FREE SHOW TICKETS

If you wish to collet your A3000 at the Acorn User Exhibition reserve it now and we will send you two admission tickets free of charge. If you cannot get to the show, your computer will be despatched by courier on Monday 24th July.

MEMBERS SPECIAL OFFER

If you are not yet a member, subscribe now to RISC User, The Archimedes magazine (UK £14.50) and when purchasing your A3000 you will then also receive Artisan, Pacmania, 4-Way Spike Protection Socket Strip, 10 x 3.5" Discs and a Lockable Disc Storage Box. Alternatively you may choose any other items free of charge up to 10% of the cost of the computer.

0% FINANCE

We are also able to offer 0% finance on the A3000, with a deposit of only £71.35. If you choose this option the members special offer is 10 x 3.5" Discs and a Lockable Disc Storage Box.

TRADE IN

If you have a BBC Micro, Master or Archimedes and wish to upgrade to an A3000, we will take in your old computer in part exchange.

A3000 PRIORITY ORDER FORM

I wish to order an A3000 Base/Colour System @ £746.35/£999.35 (inc VAT) ☐
I will collect it at the Acorn User Show, please send me 2 tickets free of charge ☐
I wish it to be despatched and enclose £7.00 (UK) carriage/I will collect it from the showroom. ☐
BEEBUG/RISC USER membership number ____________
I wish to subscribe to RISC USER at £14.50 (UK). ☐
A cheque for £________ is enclosed.
Please debit my Access/Visa/Connect account with £________
Card No. ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ Expiry Date______/______/
Please send further details on the A3000 ☐ 0% Finance ☐
12/24/36 Months Finance ☐ Trade In ☐
Name ____________
Address ____________
____________ Post Code ____________

Send to:
BEEBUG LTD, Dolphin Place, Holywell Hill, St. Albans, Herts AL1 1EX Tel : 0727 40303 Fax: 0727 60263

BEEBUG LIMITED

Dolphin Place, Holywell Hill, St. Albans, Herts. AL1 1EX ☎ 0727 40303 Fax: 0727 60263

NEWS beat

Acorn urges better government liaison

Acorn boss Harvey Coleman: "We listen to our marketplace"

ACORN managing director Harvey Coleman has challenged the government to forge closer contact with British hardware manufacturers for the good of the industry, the economy and the end users.

"Tell us what your future requirements will be and do so in good time so that we are better able to meet them", is his strong message to Whitehall.

He put his points forcibly at a recent meeting of Pitcom, the Parliamentary Information Technology Committee and later told *The Micro User* that he is prepared to back this up with an official Acorn reply to last year's Warren Commission Report on Information Technology.

"The government represents the vanguard of usage", he said. "If they are looking forward to things that they will need in the future they should work more closely with manufacturers, particularly manufacturers in this country, to achieve this.

"There is virtually no technology left in this country and if things continue in the same vein we could lose it all", he added. "The balance of payments deficit related to our industry is on the way up to £2.5 billion. If nothing is done to counteract this it is going to get worse.

"In America the government sees its requirements and says to manufacturers 'If you can achieve this then we will place orders'.

"That is the situation we should have in this country. The government should make more use of its procurement capabilities".

The Acorn boss discounted reports that he had accused the government of putting software before hardware. He said that at the recent Pitcom meeting, called to review the government White Paper brought out in response to the Warren Commission's report, the director of the National Computing Centre, John Aris, had said he felt the crucial point was good usage.

"I made a presentation on the importance of information technology in this country – a subject I feel very strongly about", he said. "I referred to the importance of having local technology in this country to give us the time to market our advantages.

"I did not disagree with good usage. I believe it is an essential requirement but I made the point quite strongly that the supply side is very important".

Mr Coleman also stressed the research and development contact which Acorn already has with various bodies.

"We listen to our marketplace in the UK on research and development", he stressed. "We listen to people who understand the country's requirements, particularly in the education field. They come and talk to us and we try to incorporate their ideas in our planning.

"The government should take a stronger view on the whole of its procurement side. It should get closer to the planning so we know what it wants and can provide it".

Orders pour in

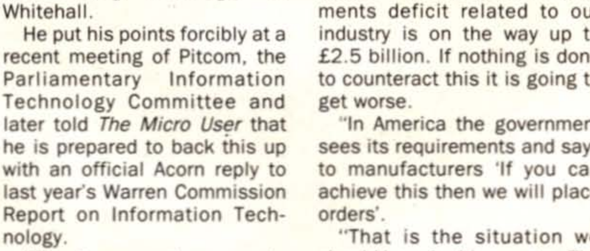
ALTHOUGH initial trade reaction was that the new A3000 micro would not set the world on fire, it was generally greeted as a machine that would kindle solid income for Acorn (see July's issue of *The Micro User*).

That has been borne out by a spate of early orders which have shown particular interest from one education authority and left Acorn in a confident mood.

Within one week of the machine's unofficial launch, the company was reporting more than 3,000 orders including one for 500 machines from Durham Local Education Authority.

"We knew that the computer would be well received, particularly by schools", said Acorn managing director Harvey Coleman. "This influx of orders so soon after the launch is very encouraging".

David Maddocks, IT and business studies adviser for Durham Education Authority, said: "We already use a lot of Acorn machines in our schools and the A3000 offers a powerful, cost-effective route for the future".



Cat takes over from mouse for games

VOLTMACE (0462 894410) has developed the Delta Cat to make games easier to play on the Archimedes. The lightweight hand-held joystick plugs into the mouse port and moving the stick has the same effect as moving a mouse. Delta Cat costs £29.95.

BEST OF BEEBUG

WORLD STOCK MARKETS
Weekly trading
Beebug News

Applications for the BBC Micro and Master Series

- **Business Graphics**
  An outstanding business graphics system which can produce high quality bar charts, line charts, pie charts and 3D charts.
- **Video Cataloguer**
  A useful program to produce a catalogue for your video cassettes.
- **Personalised Address Book**
  A quick and easy-to-use program which can hold up to 2000 entries.
- **Phone Book**
  A very user friendly electronic telephone book.
- **Mapping the British Isles**
  A useful routine which maps out the British Isles.
- **Personalised Letter-Heads**
  Design your own stylish logo to use with your correspondence.
- **World by Night and Day**
  A display of the entire map of the world showing day and night for any time and date in the year.
- **Page Designer**
  A self contained package for Epson compatibles that allows you to design and print pages of mixed text and graphics with a wide variety of layouts.
- **Selective Breeding**
  An exciting graphical representation of the principles of selective breeding applied to the insect world.
- **Appointments Diary**
  Create a Diary for any year and use it on a monthly or day-to-day basis where you can enter and edit appointments.
- **The Earth from Space**
  An impressive graphical display which recreates the world as seen from space.

JUST A FEW OF MANY...

This is just a sample of the many useful programs that subscribers have received free in BEEBUG magazine. Each issue is crammed full of:

- handy utilities
- useful applications
- hints and tips on programming
- communications
- tutorial articles on getting the most out of your computer
- reviews of all the latest products for your machine
- educational programs
- games

BEEBUG
FOR THE BBC MICRO & MASTER SERIES
Julia Sets

RECENT ITEMS MISSED BY NON-SUBSCRIBERS

The new A3000 BBC Microcomputer
Page Composition
Transparent Sideways RAM Loader
File Handling for All
DFS and ADFS Utilities
Real-Time Clock
An Extended Disassembler
3D Landscapes
512 Forum
Ins and Outs of Basic
Share Investor
Weather Pictures on Your Micro
Game Strategy

OTHER BENEFITS

When you subscribe to BEEBUG you get 10 magazines a year exclusively covering the BBC Micro and the Master series, and full of new ideas, stimulating articles and programs, mailed directly to your home, plus:

- free membership of our user group
- free help from our technical support team,
- showroom with friendly knowledgeable staff,
- swift mail-order service,
- significant discounts on our own software range and on a wide range of other products,
- trade in service to upgrade your system.

SPECIAL OFFER!

Subscribe NOW to BEEBUG and you can get the Best of BEEBUG Applications Disc at the members price of only £5.75+60p p&p.

(non-members price £15.00+60p p&p)

BEEBUG SUBSCRIPTION RATES (1 YEAR)

£14.50	UK, BFPO, Ch.I.
£20.00	Rest of Europe & Eire
£25.00	Middle East
£27.00	Americas & Africa
£29.00	Elsewhere

BEEBUG LTD

Dolphin Place, Holywell Hill, St. Albans, Herts AL1 1EX
Tel. St. Albans (0727) 40303, FAX (0727) 60263

Please supply the Best of BEEBUG disc for the members' price of £5.75 + 60p p&p ☐ non-members' price of £15.00 + 60p p&p ☐
Disc Codes: 1404A (5.25") ☐ 1409A (3.5") ☐

I would like to subscribe to BEEBUG Magazine and Support Group at £14.50 (UK) ☐

I enclose a cheque for £________ *(all cheques must be in pounds sterling, drawn on a UK bank)* or,

Please debit my Access/Visa Account No. ☐☐☐☐

Expiry date ____ / ____ / Signature ________

Name ________

Address ________

MU8 ________ Postcode ________

NEWS beat

Four shows in one

MICRO users will have a treat in store later this year when an ambitious new computer show is launched. It is the Computer Shopper Show, to be held in the Great Hall, Alexandra Palace from November 24 to 26.

Sponsored by Computer Shopper magazine and organised by Database Exhibitions, it will hit a huge market by combining four traditional shows from the festive season.

The Computer Shopper Show replaces the Electron & BBC Micro User Show, the Commodore and Atari Christmas shows and the Amstrad Computer show. It will combine all the new products, special features and bargains from these events into what is confidently being billed as the world's largest computer shopping spree.

Acorn will have a strong presence at the show where its star will be the new A3000 micro due to be launched at the Acorn User Show from July 21 to 23.

New angle on monitors

THIS fully adjustable monitor arm has been introduced by MBS (0925 830404). The Atep-Assist can be used with any type of monitor weighing up to 24kg and using a gas pressure system adjusts the height of the monitor from 90 to 325mm above the desktop. It rotates through 360 degrees and tilts 20 degrees forward or 10 degrees backwards. Price £228.85.

Pres quick to support new micro

IT has been all systems go at Pres (0276 72046) to greet the official launch of Acorn's new BBC Micro with a number of upgrades.

One drawback of the new machine's design is finding a place for the monitor. Pres has produced a monitor plinth under which the micro can be slid, being pulled out for use. Called the A3K1, it will cost between £20 and £30.

An upgrade, the A3K2 has an additional level to take a Winchester hard drive and one or two floppy drives, either two 3.5in or one 3.5 and one 5.25in.

The new machine can take a standard Archimedes expansion card and Pres has also designed a case for the card where it protrudes from the back of the machine.

In addition, the company is producing an extra board which will allow up to four extension cards to be fitted. Plans for these minicards include high-spec ADC, Midi, SCSI and rom/ram board.

Lone Wolf leads new games pack

GAMES players are being well served to a feast of new titles from Audiogenic Software (01-861 1166).

Due out now is the BBC version of Lone Wolf – The Mirror of Death. It's the first in a series of games based on Lone Wolf, the hero of 13 role-playing books written by English author Joe Dever which have sold six million copies worldwide.

Basically a combat game, it has role-playing elements with Lone Wolf fighting numerous foes in an attempt to conquer the tower stronghold of Kazan-Gor and recover the fabled Lorestones of Nyxator.

Author Joe Dever with Beverly Gardner of Audiogenic who took the role of princess for the launch of the first Lone Wolf game in Chislehurst Caves

Role playing was the basis of the off-beat launch for the game when 60 guests were given mythical characters and invited down Chislehurst Caves to search for Lone Wolf. They were then treated to appropriate refreshments including roast wild boar and venison. The BBC Micro version will cost £9.95 on tape and £14.95 on disc.

August sees the launch of Emlyn Hughes Arcade Quiz. The former skipper of England and Liverpool has given his name to this multiple choice question and answer program based on a typical pub quiz and

Turn to Page 11 ▶

How to get organised

MITRE Software (01-283 4646) has developed a time management tool for the Archimedes range which it claims is straightforward enough to keep the most disorganised person in order.

TimeWatch, which manages appointments and includes a day to day notebook and a "to do" list, costs £29.95.

Mitre is also offering a discount for users of its Archimedes DeskTop Enhancer who want to upgrade to the new Risc OS package DiscTree. If they return their DTE disc to Mitre they can obtain DiscTree for £39.95 instead of the full price of £49.95.

Acorn
The choice of experience.

Archimedes

BEEBUG the Leading Archimedes Specialists

BEEBUG

Acorn's NEW A3000 Computer

ACORN A3000 SERIES		
0255G	A3000 Entry System	649.00
0256G	A3000 Colour System	869.00
ARCHIMEDES 300 SERIES		
0193G	310 Entry System	899.00
0195G	310 Colour System	1119.00
0257G	310M Entry System	959.00
0259G	310M Colour System	1179.00
ARCHIMEDES 400 SERIES		
0260G	410/1 Entry System	1199.00
0261G	410/1 Colour System	1419.00
0262G	420/1 Entry System	1699.00
0264G	420/1 Colour System	1919.00
0275G	440/1 Entry System	2499.00
0276G	440/1 Colour System	2719.00
0263G	440 Entry System	1929.00
0265G	440 Colour System	2149.00

PRICES EXCLUDE V.A.T.

BEEBUG offers you:

Technical Support Department
We don't lose interest as soon as you've made your purchase. You can always telephone our Technical Support Department or Showroom for some friendly and impartial advice.

Archimedes Magazine - RISC USER
Subscription is just £14.50 a year (UK), for this 56 page magazine packed full of useful information, programs, news, hints and tips etc.

Repairs and Service
If things do go wrong, you can be confident of our repair and service department. We will get your computer repaired as soon as possible, and return it to you free of charge, for a full year from the date of purchase.

Price
Our prices are competitive, but if you see a better current deal from another Acorn dealer, we will be pleased to match it. In that way you can be sure of the best price as well as outstanding support and service.

Speedy Service
We have a showroom in St Albans where you can see and try any of the systems. They are always on display and in stock. Our mail order service is also very efficient, with over 80% of orders going out the same day. 48 hour delivery charges on a complete system are just £7 and 24 hour delivery £11.50.

Payment and Finance
We accept cheques, Connect, Access and Visa, and are able to offer various credit options including 0% finance over 9 months or 13.75% flat rate (typical APR 28%) over 12, 24 or 36 months.

Archimedes Price Guarantee

We will match any current price or offer available from any other reputable Official Acorn Dealer.

FREE MEMBERS SPECIAL OFFER ON ARCHIMEDES
Artisan, Pacmania, 4 Way Mains Spike Socket Strip, Printer Lead, Ten 3.5" discs & Lockable disc box
OR
A choice of goods up to 10 % of the value of your Archimedes Computer.

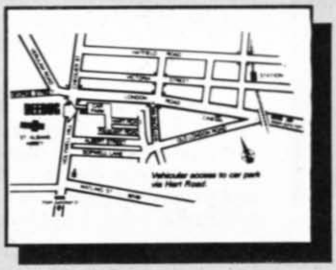
Please enquire for details of member's offers with 0% finance.

FURTHER DETAILS

Please telephone for more information on:

- 0% Finance over 9 months
- 12/24/36 Month Finance
- Trade-ins for Archimedes

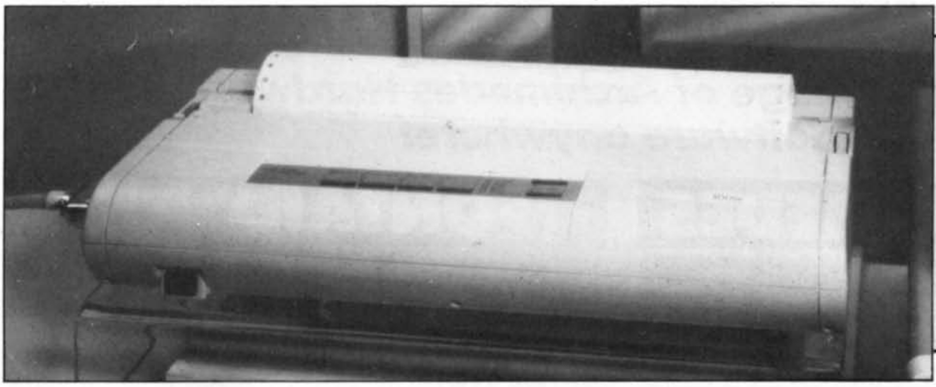
Finance arranged within 48 hours and all orders for Archimedes despatched within 24 hours.



BEEBUG Ltd

Dolphin Place, Holywell Hill, St. Albans,
Herts., AL1 1EX
Opposite Clarks Camera Shop on Holywell Hill
Showroom open
9am - 5.30 pm Mon - Sat Thursday late 'til 8pm
☎ (0727) 40303 Fax (0727) 60263
(Answering machine from 5pm)

NEWS beat



SOFTLY SOFTLY INK JET

KODAK (0442 61122) has launched the Diconix 300W ink jet printer targeted at open plan offices because of its low noise level. It costs £599.

Pro packs upgraded

THE range of professional packages from MEWsoft (01-267 2642) has been upgraded for the Archimedes. They are now fully Risc OS compatible and have been expanded over the original micro programs.

Fax File Manager is a suite of personal organiser programs, Forms Manager provides fonts, lines, boxes and grids for designing forms and Fancy Labeller combines fonts and frames for label design. Each costs £27.90.

New games

◀ ***From Page 9***

combined with some arcade-style action. Again, BBC Micro prices are likely to be £9.95 and £14.95.

Other recent BBC releases from Audiogenic are Blast, an original game with familiar elements from the author of Shark and Fab Four, a four game compilation of Omega Orb and Thunderstruck 2 which have never previously been compiled, plus Psycastria 2 and Sphere of Destiny 2 which are re-mixes of classic originals. Both cost £9.95 on tape, £12.95 on disc.

Looking further into the future, Audiogenic is developing a game called Freeway Warrier for which it hopes to have a BBC Micro version.

Chance to shine with DTP

WITH the world of desktop publishing at their fingertips, Archimedes owners can demonstrate their skills in a national competition.

The 1989 Desktop Publishing Awards are once again being organised by Database Exhibitions and Pira, the Paper and Board Printing and Packaging Industries Research Association.

Winners will be announced at the Desktop Publishing Show which runs from October 4 to 6 at London Arena.

Judges for the 1989 awards will be executive editor of The Independent, Michael Crozier, production director of Macmillan Publishers, Michael Barnard and the author of Design for Desktop Publishing, John Miles of Banks & Miles.

Categories are for the best magazine, newspaper, book, technical manual, in house company report, brochure, leaflet and newsletter. Awards will also be made for Desktop Journalist of the Year, Desktop Editor of the Year, Desktop Designer of the Year and the most original use of DTP.

Further details and entry forms available from Elizabeth Strutt, Pira, Randalls Road, Leatherhead, Surrey KT22 7RU. Tel: 0372 376161.

A tune for charity

ALTRUISM is not dead, even in the tough commercial world of computers. Ronald Alpiar of Dorset has developed Eucorn, a music performance package for the Archimedes 310 and is offering it free with the request that users make a donation to charity.

"Eucorn enables handicapped or disabled musicians to perform rather than merely play pieces of music and, of course, can also be used by able-bodied people", said Ronald. "There is no charge for Eucorn but after receipt and testing, it is hoped that customers will donate a suitable sum directly to any recognised charity".

The package includes both performance and music input programs, a repertoire of classical pieces, a 70 page user guide and is a follow-up to astronomy program Sky Baby which raised several thousand pounds for charity.

Anyone wanting to obtain the package should send a stamped and address envelope and a 800k formatted 3.5in disc to Stellar Enterprise, 84 Dudsbury Road, Ferndown, Wimborne, Dorset, BH22 8RG. Tel: 0202 5752345.

ENHANCED MOUSE GRAPHICS

NIDD Valley Micro Products (0423 870145) has combined enhanced versions of its Illustrator and Colourbox software into one package. The new Illustrator-Colourbox for BBC Micros, an easily used, mouse-operated graphics and art package, costs £59.90 including a Nidd Valley mouse.

The aim's the same

THE fledgling Entertainment Software Publishers Association has sidestepped a sticky problem and gone international at one fell swoop.

After discovering that its initials coincided with those of the Educational Software Publishers Association, it has changed its name to the European Leisure Software Publishers Association. By doing so it has also opened up membership to many continental software houses which have expressed an interest.

"There was added impetus to include European in the name because a lot of our members export to Europe and there are firms in other countries that we would like to include in our membership", said chairman Andrew Hewson.

CJE micro's

THE ACORN SPECIALISTS

The widest range of Archimedes Hardware & Software anywhere!

Phone CJE Micros NOW to ORDER YOUR "A 3000"
(Please ring for confirmation of availability)

ARCHIMEDES

External Drive Interface

Fully buffered with link options. THE BEST
£30.00/£40.00. N.B. not all drives are
Archimedes compatible

Drive Swap Switch

For above makes extern
internal drive '1'
Emul
be

aves
om a Beeb.

DFS Utils

quick and easy to use program that will
transfer all or selected files from DFS to
ADFS and ADFS to DFS.
DFS Formatter included £20.00
DFS Reader only £13.00

Monitor Switch Box

Archie/BBC. Plug both a BBC and an *Archimedes* into an *Acorn Archimedes* colour monitor. £10.00.

Archimedes <-> BBC RS423 link kit including file transfer software. £15.00.

PRICES INCLUDE VAT

P&P £1 or as quoted
TRADE & EXPORT ORDERS WELCOME
please enquire for delivery cost.
Phone/Credit Card and Official Orders welcome.

C.J.E. MICRO'S (Dept. MU), 78 Brighton Road, Worthing, W. Sussex BN11 2 EN
(0903) 213361 (3 lines)

FONTAID

'FONTAID' NLQ Fon
CANON/TAXA
(A

Q for most printers
space version now available)
'INFORM' Sideways Ram
information system!
Ring for a leaflet

PRINTERS & MONITORS

PRINTERS
Star/Canon/Panasonic/Juki
MONITORS
Philips/Microvitec
Ring for best prices

Archimedes
Acorn
The choice of experience.

Special offers on ARCHIMEDES & MASTERS.
Ring for details.
Officially approved ACORN/ARCHIMEDES Dealer & Service Centre.
Come to our shop for a demonstration.

NEWS beat

DGA hopes to back a winner

PUNTERS who like a flutter on the horses but want help with backing winners will welcome the decision by DGA Software (061-330 0184) to release a second edition of Pro-Punter.

With the emphasis on speedier data input, the main feature of the redesigned software will be an interactive database which will store form for racehorses if required at a later date. It will sell for £62.50 compared with the present version at £57.50.

A slightly revised edition of Pro-Pools will also be launched to coincide with the next football season. It will remain at £44.99.

DGA recently took over Coda Software but both companies will retain their own identities. "The acquisition of Coda provides us with a ready-made games title whose product range we can further develop into the 90s", said David Atherton of DGA.

Mandarin's Euro link

MANDARIN Software (0625 878888) has taken a major step towards 1992 by signing a deal with German distribution house Ariolasoft. "Ariolasoft will undertake the advertising, promotion, translation and distribution, in fact everything, on behalf of Mandarin in Germany", said Anne Creasey, Mandarin's head of exports.

"Mandarin already has a profile in Germany, but we believe that this formal link-up will increase our presence substantially in what is the number one European market".

Willie Carmincke of Ariolasoft said: "We are most impressed with Mandarin's products and look forward to a long and fruitful working relationship".

Star has twin-bin answer

WHY pay more for a duplex printer when most of the time you only want to print on one side of the paper? That question is answered by Star Micronics (01-840 1800) with its new LaserPrinter 8IIT.

This twin-bin machine joins the ranks of the few simplex laser models on the market and is one of the fastest eight page per minute printers currently available. The two standard input hoppers can each take 200 sheets of A4 paper with an optional high capacity feeder housing 1,000 sheets.

"Most dual-feed laser printers are duplex, yet users rarely require the facility to print on both sides of the paper, so why should they pay for a feature they don't really need", said Star's national sales and marketing manager Roger Bayley. "We think our new LaserPrinter 8IIT costing £2,589 represents an attractive, sensibly priced solution".

SurgeBreaker Plus
Inmac

If lightning strikes ...

UNUSUALLY hot summer weather has brought with it thunderstorms that can worry computer users. Heavy mains surges can be caused by lightning, but Inmac (0344 424333) has developed a three tier protection.

The Surgebreaker has three suppression circuits so that after the first circuit blows to absorb the energy there are still two left for further surge protection. It costs £59 with four outlet sockets and £69 with six.

Tools for Archimedes programs

ACORN has produced a range of software development products for the Archimedes designed to met the needs of programmers at all levels.

Now available are release 2 versions of Ansi C, Fortran 77 and ISO Pascal compilers, plus an Archimedes Assembler, a text editor and a Software Developer's Toolbox.

The upgrade price for the compilers is £34; full price is £113. Archimedes Assembler which offers direct access to Acorn's ARM central processor instruction set and the Developers Toolbox set of utilities both cost £228.

CADSOFT (0420 62784) has added Maestro Presenter, a computerised conference presentation package, to its Studio 8 system based around the Archimedes. Maestro Presenter is designed for showing high quality video images generated by Studio 8.

Pixel for Risc OS

PIXEL Perfect, the Archimedes desktop publishing program from AVP (0291 625439) has been completely rewritten to take advantage of Risc OS multi-tasking.

Because of its straighforward approach, Pixel Perfect is used in many schools for the design of magazines, newsletters, posters and course work.

New features include the automatic flowing of text from one page to the next, a greater variety of fonts for application to imported files of text, far more facilities for drawing and manipulating geometric shapes and data storage which now allows roughly 15 full A4 pages to be saved on one disc. Price £109.25.

CEEFAX Guide

B B+ M

Software is currently transmitted for a period of one week. Files are available from Friday afternoons to the following Thursday evening, with the exception of the Issues teachers' notes which, due to their topical nature, are available from the Wednesday morning to the following Tuesday evening during the week of transmission. The details are provisional only.

July 7 to 13

Signal1 Signal2 Signal3
Signal4 Signal5 Signal6
Signal7 Signal8

Don't get lost at sea. Find out all about navigation lights and buoys as seen from the bridge of a sailing boat.

B/Knight P/Knight Knisoltxt
P/Sol

A superb demonstration of the commonly misunderstood technique of recursion. Separate Basic and Pascal programs have been written using this method to solve the old problem of the *Knight's tour*. Both are well written and fully documented for easy understanding.

Arcdemo

Everybody knows the Archimedes is better than the 8 bit BBC Micro – or is it? Here's a demonstration that reproduces on the original BBC Micro a graphics demonstration first seen on the Archimedes. The program was published in the June issue of *The Micro User*.

July 14 to 20

Giant GText

This is an experiment in broadcasting software for the Acorn Music 500 synthesiser. This program is not compatible with the 5000, but if enough people show interest further music files may follow.

Timer

This utility, published in the June issue of *The Micro User*, helps you analyse time spent in various parts of your program and discover where it is being wasted. It's a very useful aid to efficient program writing.

Easy Help Pixel
Draw Draw2 Draw3
Box

Good art packages are not confined to the Archimedes: Here's one for your BBC Micro. Routines for drawing shapes, filling areas and even a pixel editor are included in this first part of two transmissions.

July 21 to 27

Font Fontinf Example

Font is a comprehensive designer that allows redefinition of all the 255 available characters if you wish. Full documentation and some general information on fonts is provided in the package.

Screen Picture House
Map Bird Lounge

These are demonstration screens for the BBC Micro art package broadcast last week. They may be loaded using the load option provided in the editor.

Maze Mazetxt

Escape to the privacy of your own maze or let someone else do the same with this complete maze designer. Mazes can be constructed automatically, then sent to an Epson compatible printer for a hard copy.

5Alive

Five Alive is a sparkling arcade adventure from the June issue of *The Micro User*. Move around each of the eight levels collecting the treasures and avoiding the baddies until you are transported to the next. It will certainly have you coming back for more.

July 28 to Aug 3

Voida2 V2FileA

Boost your concentration capacity with this high-speed action game. Let your imagination run wild as you steer your ship through a barrage of oncoming obstacles. The game gets increasingly harder as you go.

TVAlign TVInfo

Test your monitor or TV with TVAlign which produces a series of screen displays to test your VDU's characteristics. An experienced TV engineer can use these tests to adjust a set for optimum performance.

B/Dial Dialtxt

Get the most from your Acorn Prestel adaptor. B/Dial will allow use of the adaptor's firmware in modes other than teletext and leave existing facilities untouched.

Evolut

Simulate evolution on your BBC Micro with this superb simulation of the world of genetics. It was published in the June issue of *The Micro User* and produces a graphical result of the final population.

Aug 4 to 10

Bisness

A lively and addictive simulation of the world of the small business. Take the reins of your very own company – in debt to the bank and facing an ultimatum to pay up. Wheel and deal, hire and fire as you battle for survival.

B/Guide B/Rom M/Guide
M/Rom Update Notes

Here's a toolkit with more than 40 useful utilities for the BBC Micro. The facilities can be loaded into sideways ram or blown into an eprom – The security start-up facility provided in the package takes full advantage of this.

Dat_Inf Image

Add another three commands to your operating system and solve the problem of recalling the latest version of a file by date stamping it when saved. Each version then contains its own unique identity. Since the package uses the internal clock it will only run on a Master series machine.

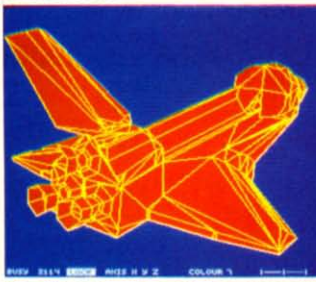
Elimin8

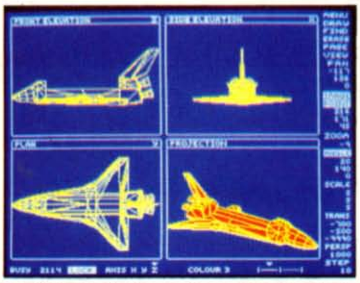
Find every anagram of long words or phrases with Eliminate: An amazing utility from the June issue of *The Micro User*. It's an ideal aid to help you win the *how many words can you make from?* type of competition.

SILICON VISION

SOFTWARE FOR THE ARCHIMEDES & BBC

SolidCAD





The ultimate 3D Draughting System for Architectural design, Interior design, Engineering Design and Teaching CDT. Allows drawing in plan, front & side elevations and also directly in 3D view. Includes powerful zoom & pan options for precision draughting and surface definition for creating solid colour objects. Also includes Sweep, Extrude & Macro facilities for designing very complex objects easily. Designs created with SolidCAD are compatible with the Realtime Graphics Language for high-speed flicker-free animation. The custom Archimedes version also performs smooth shading for realism. SolidCAD(Arc) users can upgrade to the Realtime Solids Modeller (Arc) for £40.00.

£49.95 (ARC or BBC B/B+/Master), New

REALTIME SOLIDS MODELLER

The package includes both the sophisticated design environment of SolidCAD and the high speed animation capability of a Realtime Graphics Language (RGL) module developed in pure ARM Risc code for supercharged performance. The package is ideal for Architectural design, Interior design, Engineering design & teaching CDT. The RGL module can be used to create standalone flicker-free animation of designs from your own programs. Smooth shading is also performed for realistic images. Through our in-house expertise in 3D Design and High-speed techniques, no other package can rival the design environment & animation speed of the Realtime Solids Modeller.

£89.95 (ARC) New

REALTIME GRAPHICS LANGUAGE

The Realtime Graphics Language rom provides a complete 3D Solids/Wireframe animation system with 52 star commands and 3D Editors for designing objects to animate from your own programs. Includes a 35,000 pixels/sec line generator for fast 3D drawing rates, 3D Rotate, Scale, Orbit, Perspective and Turtlegraphics. Also compatible with designs created with SolidCAD (BBC).

£49.95 (BBC B/B+/Master)

SUPER-DUMP

The ultimate printer driver which takes advantage of the highest resolution capability of ordinary Epson compatible printers to provide 1920×1024 resolution. Images can also be scaled, positioned and previewed before printing. Fully compatible with SolidCAD, Realtime Graphics Language, Gate-Array design system & 3D CAD/Animation system. Your own graphics programs or other CAD packages can be made compatible with Super-Dump by the addition of a few simple commands. An example program is included in the package.

£15.95 (BBC B/B+/Master), £24.95 (ARC) New

Presentation System

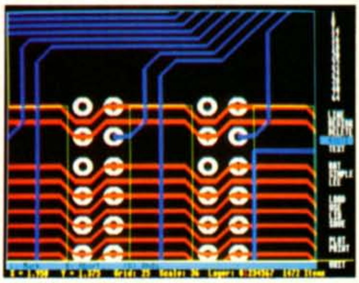
The package provides an interactive environment to create, edit and play-back computer controlled presentations for lectures and demonstrations. Also handles graph plotting for polynomials & user-defined functions which can be incorporated within the presentations.

£34.95 (BBC B/B+/Master), £49.95 (ARC) New

All Archimedes software run in native mode on A305 – A440 & A3000 with Arthur 1.2 or RISC OS

SILICON VISION LTD, SIGNAL HOUSE, LYON ROAD, HARROW
MIDDLESEX HA1 2AG. TEL: 01-422 2274 or 01-861 2173
FAX: 01-427 5169. TELEX: 918266 SIGNAL G.
(Access/Mastercard/Eurocard accepted)
All prices include VAT and Carriage (Overseas orders add £4).

ARC-PCB



The ultimate PCB design system developed specifically for the Archimedes with a specification that cannot be matched. Includes Automatic routing, Rats-nesting, 8 layers, Surface mount capability, 0.001" resolution, 32"×32" maximum board size, On-line Help, Fast Zoom/Pan/Redraw, Text & Silkscreen facility, Variable Line/Pad/Text/Grid sizes, Part Libraries, Block Move/Copy/Rotate/Mirror/Erase options, and up to 300,000 components.

For hardcopy, the system supports the industry standard HP-GL, GRAPHTEC, PLOTMATE plotters and printers at their highest resolutions. Also provides automatic drilling information with extensive support from PCB manufacturers for final layout and production, optional 1 year telephone Hotline support (£100) and software maintenance service (£75) is also available.

£195.00 (ARC) New

Risc BASIC

The first true BASIC V syntax compiler which will convert your programs into supercharged Risc code for turbo performance leaving the competition standing. Features include Relocatable modules, full cross references, Double precision floating point & Integer support, in-line assembly, Window-based or command line compilation environment, standalone code generator, object code optimiser, full array manipulation and dimensions support, multiple exit structures & full runtime error handler.

£99.95 (ARC) New

RiscFORTH

A new 32-bit implementation of the FORTH-83 standard, designed to take full advantage of the ARM architecture. Features include Multi-tasking, Optimising compiler, built-in ARM assembler with floating point mnemonics, built-in Full screen Editor, File system interface, OS calls support, Floating point & Integer maths, WIMP support, Single-step debugger, Shadow screen for documentation, Block manipulation, Dictionary & Vocabulary display, Call finding and a standalone code generator.

£99.95 (ARC) New

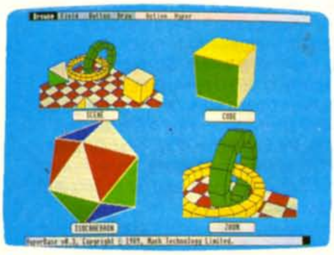
MACH

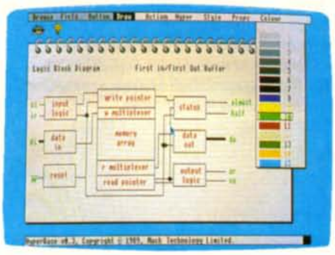
ARCHIMEDES MEMORY UPGRADES

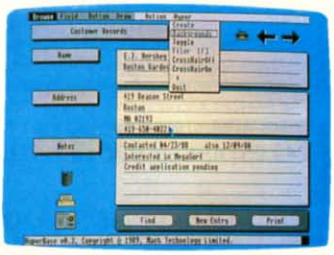
Break the Megabyte barrier with Mach Technology's 2MB and 4MB expansion boards for 300 Series machines.

2Mbyte — £340
4Mbyte — £520

HYPER BASE


SCENE
CUBE
ZOOM


Draw
Logic Block Diagram
First In/First Out Buffer
input logic
write pointer
status
data in
memory array
data out
reset
read pointer
output logic


Customer Records
Name
Address
Notes
Find
New Entry
Print

An advanced database architecture supports 'cards' and 'stacks' which can contain textual and graphical information in any combination.

Cards may be connected via user defined links to allow arbitrary information networks to be constructed.

Other features include powerful search and query functions across text fields, sorts and calculations, report generation and printing and the exchange of text and graphic images with other programs.

£49.95

MODULA-2

The epitome of structured programming languages now available on the Archimedes.

- ✱ Advanced development environment
- ✱ Separate compilation
- ✱ Rapid development cycle
- ✱ System library support for Risc Os, graphics, WIMP
- ✱ Extensive documentation
- ✱ Language tutorial

£89.95

MACH BASIC

A true production quality compiler that supports the full BASIC V language. State-of-the-art parsing, analysis and code generation techniques combine to produce the fastest compiler around.

£39.95

TECHNOLOGY

MACH-286

GEM Draw Plus
PageMaker
Adobe Illustrator

Open the door to largest software base in the world with our fully IBM compatible co-processor.

The Mach-286 features a full-speed Intel 80286, the MS-DOS operating system, standard graphics support, numeric co-processor facility, the Mach BIOS and more for only £299.

HARD DISC SYSTEMS

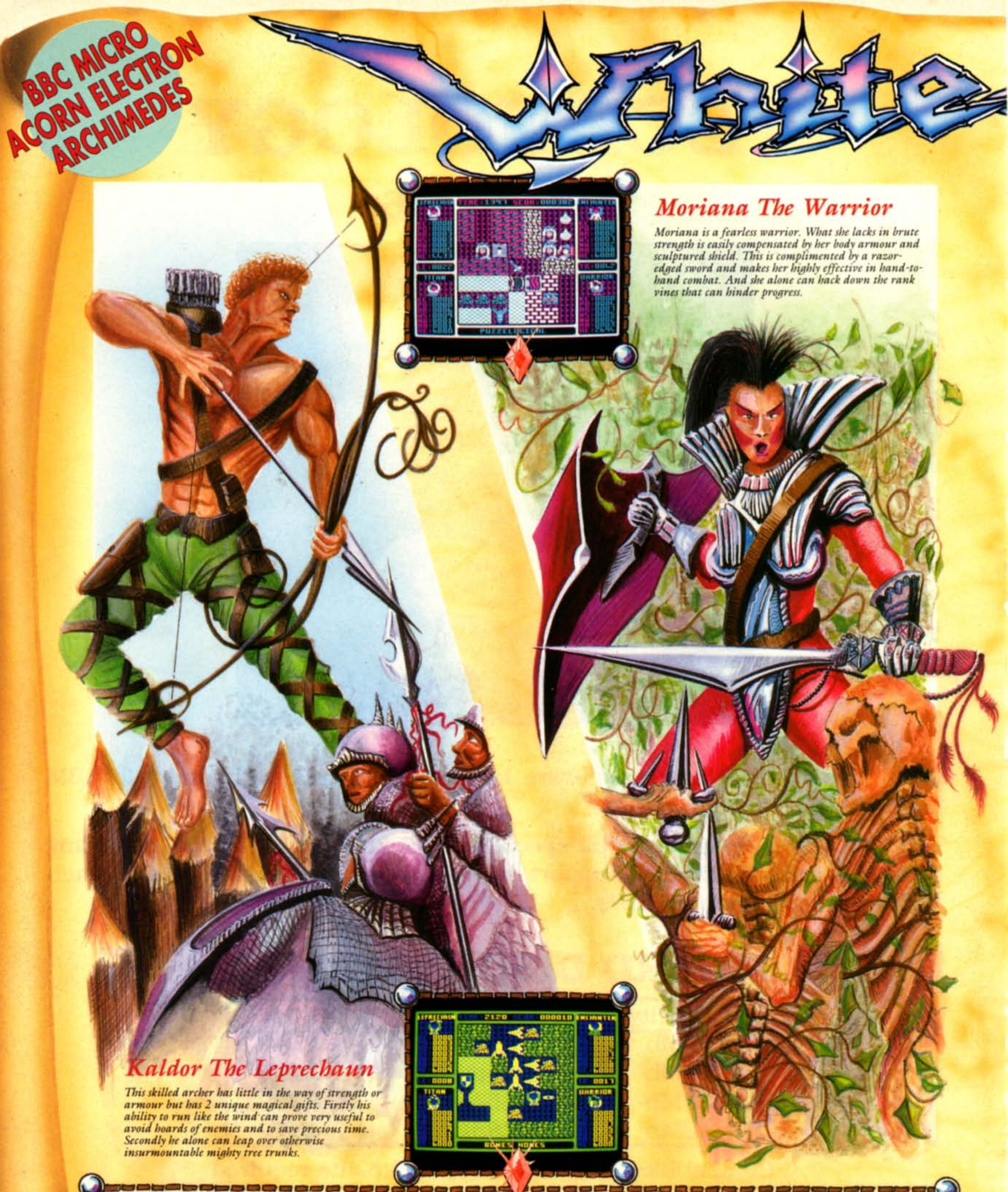
Capacity	Access Time	Price
20Mb	65ms	**£249**
20Mb	35ms	**£289**
30Mb	35ms	**£339**
40Mb	28ms	**£379**

Compatible with A305-310, backplane required

Software prices include VAT and delivery in the UK
Hardware prices exclude VAT and carriage

MACH TECHNOLOGY LTD

75 Hydewood Road, Little Yeldham, Essex CO9 4QX
Tel: (0787) 238125. Fax: (0787) 238114



Moriana The Warrior

Moriana is a fearless warrior. What she lacks in brute strength is easily compensated by her body armour and sculptured shield. This is complimented by a razor-edged sword and makes her highly effective in hand-to-hand combat. And she alone can hack down the rank vines that can hinder progress.

Kaldor The Leprechaun

This skilled archer has little in the way of strength or armour but has 2 unique magical gifts. Firstly his ability to run like the wind can prove very useful to avoid hoards of enemies and to save precious time. Secondly he alone can leap over otherwise insurmountable mighty tree trunks.

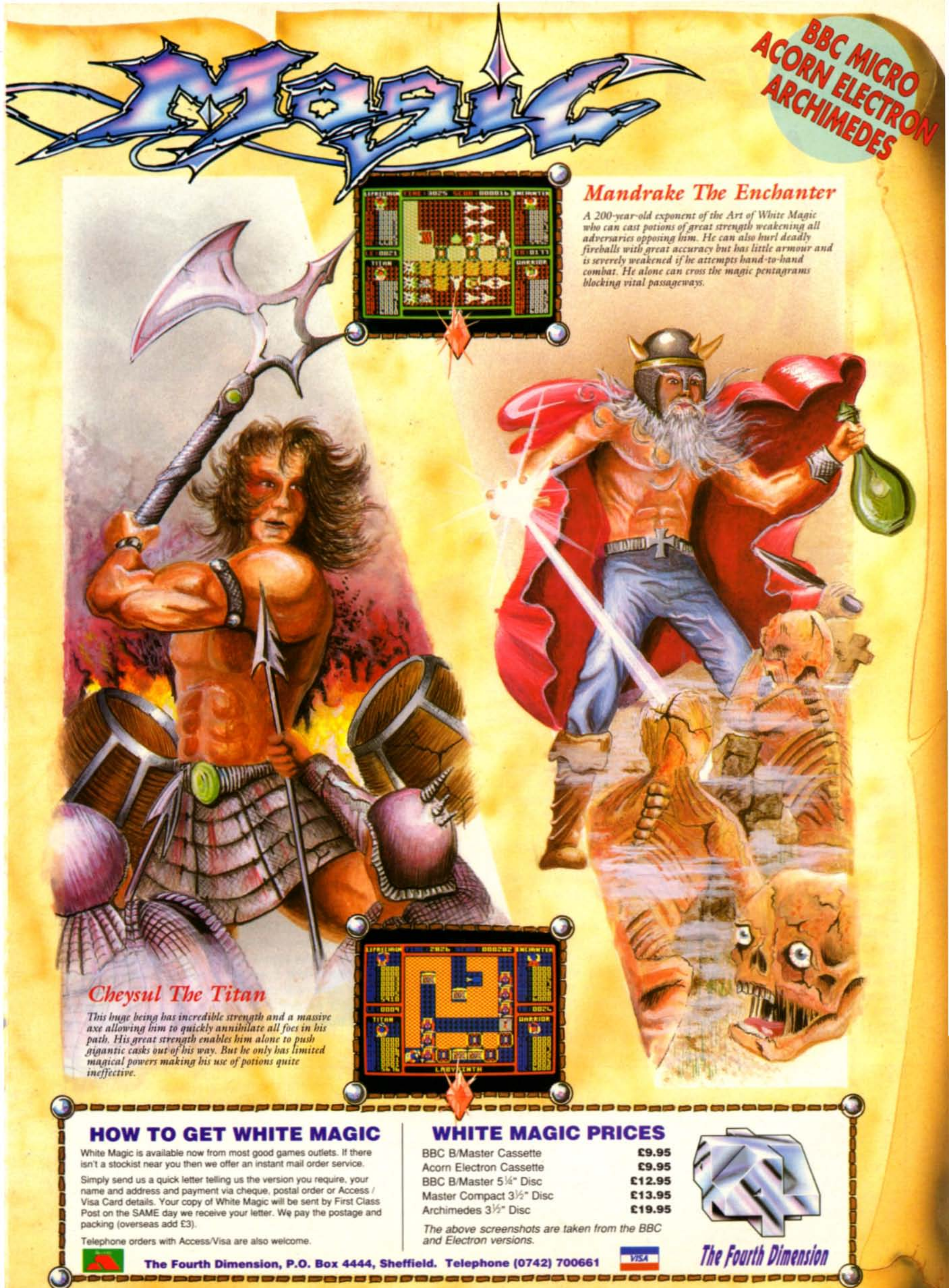
White Magic – Where Good embodies Bad and Fantasy becomes Reality

White Magic is a unique arcade adventure in which you can actually transform between all 4 characters at any time during play. It features 32 massive action-packed levels filled with aggressive evil guards and trolls, haunting ghosts and spectres, curious objects to find and use, transporters and much, much more.

To complete the game you must survive all 32 levels, each with its own theme. Certain characters will fair better than others on different levels and it is your job to know when to transform between characters if you are to succeed.

White Magic is not a game for the faint-hearted; it is a fast-action game which requires fierce hand-to-hand combat and frantic weapon fire. Each character has his or her own levels of energy, weapon strength, magical power and armour. And by carefully collecting the artefacts as you progress through the levels you can develop each of the characters to their maximum potential.

Artefacts can be useful or harmful and include such things as potions, spellbooks, amulets, time-bombs, swords, time-pills, scrolls, shields, ammo-boxes, staffs and rings. White Magic puts you amongst heroes in a world of magic, danger and adventure. Is it all just a dream?



Mandrake The Enchanter

A 200-year-old exponent of the Art of White Magic who can cast potions of great strength weakening all adversaries opposing him. He can also hurl deadly fireballs with great accuracy but has little armour and is severely weakened if he attempts hand-to-hand combat. He alone can cross the magic pentagrams blocking vital passageways.

Cheysul The Titan

This huge being has incredible strength and a massive axe allowing him to quickly annihilate all foes in his path. His great strength enables him alone to push gigantic casks out of his way. But he only has limited magical powers making his use of potions quite ineffective.

HOW TO GET WHITE MAGIC

White Magic is available now from most good games outlets. If there isn't a stockist near you then we offer an instant mail order service.

Simply send us a quick letter telling us the version you require, your name and address and payment via cheque, postal order or Access / Visa Card details. Your copy of White Magic will be sent by First Class Post on the SAME day we receive your letter. We pay the postage and packing (overseas add £3).

Telephone orders with Access/Visa are also welcome.

WHITE MAGIC PRICES

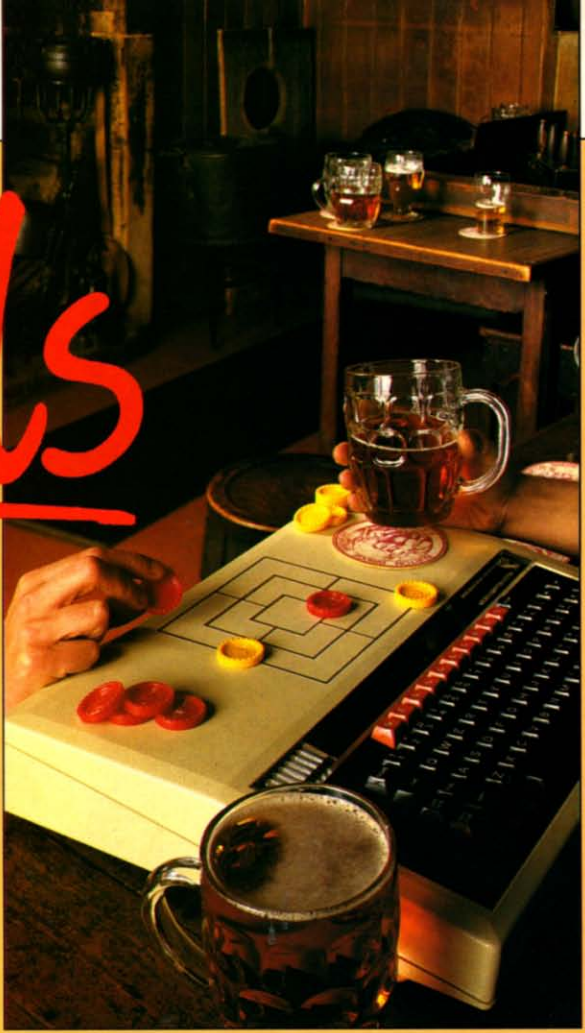
BBC B/Master Cassette	**£9.95**
Acorn Electron Cassette	**£9.95**
BBC B/Master 5¼" Disc	**£12.95**
Master Compact 3½" Disc	**£13.95**
Archimedes 3½" Disc	**£19.95**

The above screenshots are taken from the BBC and Electron versions.

The Fourth Dimension, P.O. Box 4444, Sheffield. Telephone (0742) 700661

The Fourth Dimension

Merrills



Cliff Hamer takes a modern approach to an ancient game

MERRILLS is probably one of the oldest games still played today. Boards have been found in and on many historic buildings throughout the world. Traces occur on objects from the first city of Troy and another from a bronze age burial site in Ireland. The earliest one that can be dated was found on the Gokstad Viking ship burial of 870AD.

In Britain, many buildings have boards in positions where play would be impossible, so it is assumed that stonemasons played on them before using the stone in the construction – an example can be seen on a pillar in Pickering Church. Separate boards exist at Helmsley Castle, Whitby Abbey and the medieval village of Wharram Percy. An early wooden example was found cut into the top of a barrel on the Mary Rose.

The game has a variety of names in many languages, quite a few relate to mill – the term used for three pieces in a row during play. Merrills, the name favoured in the north of England, is derived from Latin and old French words meaning a counter or playing piece.

The BBC Micro version of Merrills presented here is written in two sections. The first gives a summary of the rules, draws the board and loads the second part – is the main program which controls play by not allowing bogus or illegal moves.

Type in Listing I and ensure you have entered it exactly as printed using Get it Right! Save with the name MERILLS and then type NEW. Enter Listing II and save it with the name MER2. Note that there's a REM in Line 40 that can be removed from the line after testing to disable Escape while the game is being played. To play the game, simply enter:

```
CHAIN "MERILLS"
```

When you run it the program will keep you and your opponent playing within the rules as they are shown in the panel on the page opposite. If you are faced with impending defeat pressing Tab at your move will concede the game. Similarly if a draw is agreed either player may press Return. The program will then allow another game to be started.

After last year's successful World Championship, the Ryedale Folk Museum will be staging the 1989 Theakston World Merrills Championship. Further details from World Merrills Association, Ryedale Folk Museum, Hutton le Hole, York YO6 6UA. Telephone: 07515 367.

```
   10 REM MERILLS
   20 REM MERRILLS by Cliff Hamer
   30 REM (c) Micro User
   40 MODE7
   50 VDU23;11,0,0;0;0;
   60 PRINTTAB(1,0);CHR$(141);CHR$(131);
"MERRILLS---MERRILLS---MERRILLS"
   70 PRINTTAB(1,1);CHR$(141);CHR$(131);
"MERRILLS---MERRILLS---MERRILLS"
   80 PRINTTAB(4,2);"The object of the g
ame is to reduce"
   90 PRINT"your opponent's number of pi
eces to two."
  100 PRINTTAB(4,5);"This is acheived by
placing pieces"
  110 PRINT"on the board, in turn, in an
attempt to"
  120 PRINT"get three pieces on one line
, forming"
  130 PRINT"a 'MILL'.";
  140 PRINTTAB(0,9);"This enables the re
moval of an opponents";
  150 PRINT"piece that is FREE -- not in
a 'MILL'.";
  160 PRINTTAB(4,12);"After both players
have placed their";
  170 PRINT"nine pieces on the board, pi
eces can be"
  180 PRINT"moved, in turn, into ADJACEN
T spaces.";
  190 PRINTTAB(4,16);"When a player has
been reduced to"
  200 PRINT"three pieces, a piece can be
 jumped into";
  210 PRINT"ANY space."
  220 PRINTTAB(0,19);"If a player's piec
es are 'blocked in',"
  230 PRINT"the game is lost. A player m
ay QUIT by"
```

Listing I

THE RULES OF THE GAME

Merrills is an ancient game for two people, played on a special board with nine pieces, pegs or counters each. The board has three concentric squares linked through the centre of each side. This provides 24 intersecting points arranged in 16 lines of three.

Play is divided into three stages, but the object throughout is to get three pieces in a line – called a mill. On forming a mill, one of the opponent's pieces is removed from the board and the game is won by the player who reduces an opponent's remaining pieces to two.

The opening stage begins with an empty board. Each player has nine pieces which are placed one at a time in turn on any vacant point on the board until both have played all nine. If a mill – line of three – is made, the player making it removes any one of the opponent's pieces that is not itself a part of a mill. Throughout the game, pieces forming a mill are therefore safe from capture.

Once a piece is removed from the board it takes no further part in the game. It is important to note that mills can only be made along the horizontal and vertical lines on the board, never across the diagonals where no lines are marked.

The middle stage starts when all the pieces have been used. Play continues alternately with the opponents moving one piece to any adjacent point. A couple of tactics are often used in this stage.

Firstly, once a mill is formed it may be opened by moving one piece from the line and closed by returning it to its original position in the next move. Alternatively, in a running mill opening one mill will close another one so that an opponent's piece is removed on every turn. A player who is unable to move any piece loses the game.

The end stage allows a player with only three pieces to move one to any empty point on the board regardless of position. The other player must continue to move normally unless both are reduced to three pieces. The game ends when one player is reduced to two pieces and so can no longer form a mill.

ARRAYS

PS%	Positions on screen are numbered 1 to 24, occupation by a blue piece indicated by a two, red by one and empty by zero.
X%,Y%,Z%	Each one of 16 lines has three distinct numbers. For example, position 2, middle top line, appears in both *Y%(1)* and *X%(12)*
d%,e%	A cross reference between the three arrays above as each position can feature in two mills.
V%,W%	Text positions for pieces
M%	Flagged to indicate a mill

PROCEDURES

init	Initialise the program variables
play	Control the second and third stages of the game
blk	Blank out board positions
men	Draw pieces and letter insets
ml	Check all possible lines to detect a mill
of	Remove piece if possible
on	Control first stage of game
go	Check if move is possible
move	Control moving of piece check for illegal move
jump	Control jumping of piece
tie	Give message for drawn game
win	Give message for a win
ag	Provide repeat game
x	Use graphics windows for messages
od	No free piece,oh dear
fl	Flash piece when placed
circ	Construct circular pieces

OTHER NAMES FOR MERRILLS

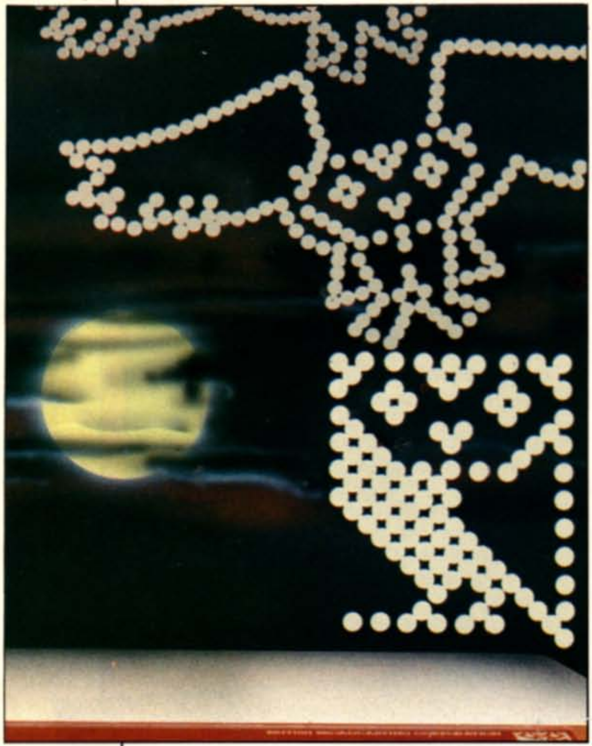
Nine Man's Morris	Britain
Muhlespiel	Austria and Germany
Jeu de Moulin	France
Tavola da molina	Italy
Pedreria	Spain
Seigen wulf myll	Poland
Mill	USA and Canada
Mylna	Iceland
Melnitsa	USSR

MAIN VARIABLES

cn%	Count men being placed
RE%	Number of red pieces
BL%	Number of blue pieces
ml%	Flagged when a mill is made
TU%	=1 for red's =2 for blue's move,
P%	Board position selected in play

```
  240 PRINT"pressing TAB. For a draw pre
ss RETURN."
  250 PRINTTAB(3,23)CHR$(136);CHR$(131);
"Press SPACE BAR to continue"
  260 REPEATUNTILGET=32
  270 MODE1
  280 VDU19,0,2,0,0,0
  290 ENVELOPE1,6,0,0,0,0,0,0,121,-10,-5
,-2,120,120
  300 *K.10CH."MERILLS"|M
  310 PROClines
  320 PROCchrs
  330 PAGE=&1200
  340 CHAIN"MER2"
  350 END
  360 DEFPROClines
  370 x%=0
  380 FORt%=0TO2
  390 PLOT68,832,576
  400 x%=x%+128
  410 PLOT0,-x%,-x%
  420 PLOT1,2*x%,0
  430 PLOT1,0,2*x%
  440 PLOT1,-2*x%,0
  450 PLOT1,0,-2*x%
  460 NEXT
  470 p%=1:n%=0
  480 FOR t%=0 TO 1
  490 z%=-250
  500 FOR x%=-132 TO 132 STEP 264
  510 PLOT68,832,576
  520 PLOT0,x%*p%,x%*n%
  530 PLOT1,z%*p%,z%*n%
  540 z%=z%+500
  550 NEXT
  560 p%=0:n%=1
  570 NEXT
```

Turn to Page 108 ▶



Spritely action

Eric Crisp moves on in his series on the technique of producing micro animation

YOU have had a month to play around with the machine code sprites we looked at in the last article, so now let's explore more ways of moving – and stopping – them. At the risk of explaining things that may appear trivial, we will begin with straight line movement. You will remember that we made a man walk to the right by setting the x coordinate – *X%* – to I%*16, where *I%* increased by one at each step.

The same effect can be achieved by setting X%=0 at the start and then adding 16 to it at each step. This does away with the loop counter *I%* while *X%* indicates the sprite's horizontal position.

The man's vertical position is indicated by *Y%*, which was kept constant at 380. If it is changed in a similar way to *X%* the man would move up the screen. If both *X%* and *Y%* are increased at each step the man would walk diagonally up and right.

Try these ideas by digging out last month's Program II, deleting line 80 and and insert:

```
17 X%=0:Y%=63:CX%=0:CY%=0
21 CX%=16:CY%=0
72 X%=X%+CX%:Y%=Y%+CY%
```

The values *CX%* and *CY%* represent the change in *X%* and *Y%* respectively. Try the program again changing line 21 to:

```
21 CX%=0:CY%=16
```

and then to:

```
21 CX%=16:CY%=16
```

Movement to the left and down are achieved in a similar way by decreasing *X%* and *Y%* respectively. Try it and see what happens by changing the values of *CX%* and *CY%* on line 21 to -16 – also change line 17 to prevent *X%* and *Y%* becoming negative like this:

```
17 X%=960:Y%=1023:CX%=0:CY%=0
```

Extra sprite shapes are needed to show the man walking to the left properly. Make them as mirror images of the three shapes defined last month – reverse their left to right pixel patterns – and save them as MAN4, MAN5 and MAN6. Six other shapes are required for the man moving up and down. Define MAN7 as standing still facing forwards, MAN8 with one foot up and MAN9 with the other foot up. Create MAN10, MAN11 and MAN12 in the same way, except facing away.

Program I has the necessary changes to use all 12 man shapes plus changes that allow the man to be moved using the ZX and /: keys without going off the screen. A description of how it works is on the facing page. When it is run you are able to move the man around in much the same way as many games do. Most have obstacles that cannot be moved through, so let's put two on the screen, a yellow box and a red wall, by inserting:

```
 13 GCOL 0,2:MOVE 0,0:MOVE 0,255:PLOT
85,319,0:PLOT85,319,255
 14 GCOL 0,1:MOVE 800,640:MOVE 800,895
:PLOT 85,863,640:PLOT 85,863,895
```

There are several ways to stop the man walking through the obstacles. One is to check that the *X%* and *Y%* values don't put the man into the obstacle. Let's try using this method to stop him hitting the yellow box.

He would be in the box if both *Y%* is less than 256 and *X%* is less than 320. In the changes following, PROCTEST checks the new X% and Y% values and sets *Z%* to 1 if they lie within the box. On exit from PROCTEST if Z%=1, *X%* and *Y%* are restored to their old values, *OX%* and *OY%*.

```
 71 OX%=X%:OY%=Y%
 73 PROCTEST:IF Z%=1 THEN X%=OX%:Y%=OY%
500 DEFPROCTEST
510 IF X%<320 AND Y%<256 THEN Z%=1 ELSE
 Z%=0
599 ENDPROC
```

You may notice a mistake – "Ha ha! Eric's made a mistake" you may chortle – but it was deliberate, honest. The man can still step into the top part of the box because X%,Y% is the top left corner of the sprite, where as the man's feet are 63 graphic points – H%*4-1 with *H%* set to 16 pixels – lower than this. To correct this, modify

```
 1 XORD=&70:YORD=&72
 2 WIDE=&74:HIGH=&75:SDAT=&76
 3 SPRITE=&903:SPRITEMOVE=&900
 4 W%=8:H%=16
 5 *LOAD SPRTcod 0900
 6 MINX%=0:MAXX%=1280-W%*4
 7 MINY%=H%*4-1:MAXY%=1023
10 MODE1:VDU23;8202;0;0;0;
11 HIMEM=&27FF
12 PROCLOAD
15 K%=0:C%=0
17 X%=0:Y%=383:CX%=0:CY%=0
18 PROCMAN(0)
20 REPEAT
22 PROCKEYS
23 *FX19
24 FORJ%=1TO35:NEXT
30 PROCMAN(1)
40 FORJ%=1TO400:NEXT
50 UNTILINKEY-99
60 GOTO 1000
 70 DEFPROCMAN(F%)
 72 X%=X%+CX%:Y%=Y%+CY%
 74 IF X%<MINX% THEN X%=MINX%
 76 IF X%>MAXX% THEN X%=MAXX%
 78 IF Y%<MINY% THEN Y%=MINY%
 80 IF Y%>MAXY% THEN Y%=MAXY%
 81 MANDATA=&2800+&20*C%
 82 !XORD=Y%*&10000+X%
 83 !WIDE=W%+256*H%+&10000*MANDATA
 85 IF F%=0 THEN CALL SPRITE ELSE CALL
SPRITEMOVE
 90 ENDPROC
100 DEFPROCLOAD
110 *LOAD MAN1 2800
120 *LOAD MAN2 2820
130 *LOAD MAN3 2840
140 *LOAD MAN4 2860
150 *LOAD MAN5 2880
160 *LOAD MAN6 28A0
170 *LOAD MAN7 28C0
180 *LOAD MAN8 28E0
190 *LOAD MAN9 2900
200 *LOAD MAN10 2920
210 *LOAD MAN11 2940
220 *LOAD MAN12 2960
230 ENDPROC
300 DEFPROCKEYS
310 CX%=0:CY%=0
320 IF INKEY(-98) THEN CX%=-16
330 IF INKEY(-67) THEN CX%=16
340 IF INKEY(-73) THEN CY%=16
350 IF INKEY(-105) THEN CY%=-16
370 IF CY%=0 AND CX%=0 THEN C%=6:ENDPR
OC
380 IF CY%<0 THEN D%=6
390 IF CY%>0 THEN D%=9
400 IF CX%<0 THEN D%=3
410 IF CX%>0 THEN D%=0
420 C%=D%+((C%+1) MOD 3)
430 ENDPROC
```

Program I

line 510 to the following:

```
510 IF X%<320 AND Y%-(H%*4-1)<256 THEN
 Z%=1 ELSE Z%=0
```

Now we'll try a different method on the red wall – testing for the red pixels that make it up. Only those at the corners of the sprite's new position need to be considered. When moving to the right the test involves the top right and bottom right corners, when moving down it is the bottom left and bottom right corners and so on. If any of these pixels tested are red, then the man must not move, as the wall is in the way.

The following additions to PROCTEST will set *Z%* to 1 if the wall is encountered.

```
 520C1%=POINT(X%,Y%)
 530C2%=POINT(X%+W%*4-1,Y%)
 540C3%=POINT(X%+W%*4-1,Y%-H%*4+1)
 550C4%=POINT(X%,Y%-H%*4+1)
 560IF CX%>0 THEN IF C2%=1 OR C3%=1 TH
EN Z%=1:ENDPROC
 570IF CX%<0 THEN IF C1%=1 OR C4%=1 TH
EN Z%=1:ENDPROC
 580IF CY%>0 THEN IF C1%=1 OR C2%=1 TH
EN Z%=1:ENDPROC
 590IF CY%<0 THEN IF C3%=1 OR C4%=1 TH
EN Z%=1:ENDPROC
```

Lines 520 to 550 get the colour of the four corners and 560 to 590 test the relevant corners for red depending on the direction of movement. This second method is useful for detecting collisions between sprites but it can also distinguish between objects. A red ball or a yellow spear, for instance, can be detected since it looks for a particular colour.

Before we can try this we need to be able to move two sprites at once. Several can share our routine as long as the information required by one is not destroyed by another. The information that needs protecting is *SDATOLD, SCRNOLD, WIDEOLD* and *HIGHOLD* – these are variables used in the sprite routines. Program II is an altered version of our already heavily modified program to enable a ball sprite to bounce around the screen while the man moves around as before.

● *To keep you busy until next month try modifying the last program into a game where the man has to keep heading the ball. It ends when the ball hits the floor. We'll give you our solution next month.*

How Program I works

Lines 6 and 7 set the maximum and minimum values for *X%* and *Y%* – note that *MAXX%* is 1280-W%*4 in Modes 1 and 4 but in Mode 0 it would be 1280-W%*2. In Modes 2 and 5 it would be 1280-W%*8.

Lines 12, 13 and 14 have been replaced by

Turn to Page 24 ►

```
  1 XORD=&70:YORD=&72
  2 WIDE=&74:HIGH=&75:SDAT=&76
  3 SPRITE=&903:SPRITEMOVE=&900
  4 W%=8:H%=16:WB%=8:HB%=8
  5 *LOAD SPRTcod 0900
  6 MINX%=0:MAXX%=1280-W%*4:MINXB%=0:MA
XXB%=1280-WB%*4
  7 MINY%=H%*4-1:MAXY%=1023:MINYB%=HB%*
4-1:MAXYB%=1023
  8 SDATOLD=&7A:WIDEOLD=&80
 10 MODE1:VDU23;8202;0;0;0;
 11 HIMEM=&27FF
 12 PROCLOAD
 15 K%=0:C%=0
 17 X%=0:Y%=383:CX%=0:CY%=0:XB%=0:YB%=1
023:CXB%=16:CYB%=32
 18 PROCMAN(0):PROCBALL(0)
 20 REPEAT
 21 PROCKEYS
 23 *FX19
 30 PROCMAN(1):PROCBALL(1)
 45 K%=I%
 50 UNTILINKEY-99
 60 MODE 7:END
 70 DEFPROCMAN(F%)
 72 X%=X%+CX%:Y%=Y%+CY%
 74 IF X%<MINX% X%=MINX%
 76 IF X%>MAXX% X%=MAXX%
 78 IF Y%<MINY% Y%=MINY%
 80 IF Y%>MAXY% Y%=MAXY%
 81 MANDATA=&2800+&20*C%
 82 !XORD=Y%*&10000+X%
 83 !WIDE=W%+256*H%+&10000*MANDATA
 84 IF F%=1 THEN !SDATOLD=MOLD1%:!WIDEO
LD=MOLD2%
 85 IF F%=0 CALL SPRITE ELSE CALL SPRIT
EMOVE
 86 MOLD1%=!SDATOLD:MOLD2%=!WIDEOLD
 90 ENDPROC
100 DEFPROCLOAD
110 *LOAD MAN1 2800
120 *LOAD MAN2 2820
130 *LOAD MAN3 2840
140 *LOAD MAN4 2860
150 *LOAD MAN5 2880
160 *LOAD MAN6 28A0
170 *LOAD MAN7 28C0
180 *LOAD MAN8 28E0
190 *LOAD MAN9 2900
192 *LOAD MAN10 2920
194 *LOAD MAN11 2940
196 *LOAD MAN12 2960
197 *LOAD BALL 2980
199 ENDPROC
300 DEFPROCKEYS
310 CX%=0:CY%=0
320 IF INKEY(-98) CX%=-16
330 IF INKEY(-67) CX%=16
340 IF INKEY(-73) CY%=16
350 IF INKEY(-105) CY%=-16
370 IF CY%=0 AND CX%=0 C%=6:ENDPROC
380 IF CY%<0 D%=6
390 IF CY%>0 D%=9
400 IF CX%<0 D%=3
410 IF CX%>0 D%=0
420 C%=D%+((C%+1) MOD 3)
430 ENDPROC
600 DEFPROCBALL(F%)
605 BALLDATA=&2980
610 XB%=XB%+CXB%:YB%=YB%+CYB%
620 IF XB%<MINXB% CXB%=-CXB%:XB%=XB%+CX
B%
630 IF XB%>MAXXB% CXB%=-CXB%:XB%=XB%+CX
B%
640 IF YB%<MINYB% CYB%=-CYB%:YB%=YB%+CY
B%
650 IF YB%>MAXYB% CYB%=-CYB%:YB%=YB%+CY
B%
660 !XORD=YB%*&10000+XB%
670 !WIDE=WB%+256*HB%+&10000*BALLDATA
675 IF F%=1 THEN !SDATOLD=BOLD1%:!WIDEO
LD=BOLD2%
680 IF F%=0 CALL SPRITE ELSE CALL SPRIT
EMOVE
685 BOLD1%=!SDATOLD:BOLD2%=!WIDEOLD
690 ENDPROC
```

Program II

◀ *From Page 23*

PROCLOAD – lines 100-230. *K%* and *I%* are no longer required – lines 15, 18, 20, 22, 30 and 45.

Line 17 initialises *X%*, *Y%*, *CX%* and *CY%*. The FOR ... NEXT loop has been replaced by a REPEAT ... UNTIL loop in lines 20 and 50 and pressing the spacebar exits it. Line 22 now calls PROCKEYS.

PROCSPRITE now only needs parameter *F%*. New *X%* and *Y%* values are calculated at line 72 and checked beyween lines 74 to 80 to ensure that the whole sprite will fit on the screen. *C%* still indicates which sprite to use, but there are now 12 to choose from.

PROCKEYS sets *CX%* and *CY%* depending on which of the keys Z, X, / or : are pressed – lines 310 to 350 – and so determines the direction of movement. If none of the keys is pressed the man is stationary – CX%=CY%=0 – so the standing still sprite, MAN7, is chosen by making C%=6 – line 370.

Lines 380 to 410 determine which set of three sprites is to be used by setting *D%* to 0, 3, 6 or 9. The actual sprite is selected by adding a value between 0 and 2 to *D%*. This value is the remainder of C%+1 divided by 3 – (C%+1) MOD 3. This ensures that the next sprite in the correct group of three is chosen.

How Program II works

Lines 13 and 14 have been deleted as we no longer want the square and wall. Similarly, 71, 73 and 500 to 599 are missing as we are not testing for collisions. Lines 24 and 40 have been deleted to make it faster.

Lines 4, 6, 7 and 17 have been changed to include setup values for the ball. – ball variable names end in B and have a similar function to their man variable counterparts.

The values of *SDATOLD* and *WIDEOLD* are set in line 8 – they must be set to the values as used in the sprite assembler. Also ensure that SCRNOLD=SDATOLD+2 and HIGHOLD=WIDEOLD+1 in the assembler.

Lines 18 and 30 now include PROCBALL and lines 84 and 86 have been inserted into PROCMAN so that the man's information which needs protecting is saved on line 86 and restored on line 84.

Line 97 loads the ball shape and 600 to 690 is PROCBALL which is very similar to PROCMAN except that *CXB%* changes to the opposite direction – CXB%=-CXB% – whenever it reaches the left or right edge of the screen. This makes it appear to bounce. *CYB%* changes in a similar fashion when the ball reaches the top or bottom of the screen.

PUBLIC APOLOGY

M.D. Office Supplies would like to take this opportunity to apologise to all its competitors. We shall with immediate effect supply direct to the public, Computer discs, Storage boxes, etc. AT BELOW WHOLESALE PRICES

5¼ 5.25" DISCS & BOXES 5¼

25 5.25" DS-DD 96 TPI with 50 Capacity Lockable Storage Box	£12.49
50 5.25" DS-DD 96 TPI with 100 Capacity Lockable Storage Box	£18.49
75 5.25" DS-DD 96 TPI with 100 Capacity Lockable Storage Box	£23.49
100 5.25" DS-DD 96 TPI with 100 Capacity Lockable Storage Box	£29.49
200 5.25" DS-DD 96 TPI with 2 100 Capacity Lockable Storage Boxes	£54.99

OUR 5.25" DISCS ARE **VERY CAREFULLY SELECTED** TO GIVE YOU 100% ERROR FREE PERFORMANCE. EACH DISC IS OFFERED WITH OUR 100% MONEY BACK GUARANTEE AND IS SUPPLIED WITH LABELS

3½ 3.5" DISCS & BOXES 3½

25 3.5" DS-DD 135 TPI with 40 Capacity Lockable Storage Box	£22.95
35 3.5" DS-DD 135 TPI with 80 Capacity Lockable Storage Box	£31.95
45 3.5" DS-DD 135 TPI with 80 Capacity Lockable Storage Box	£37.95
55 3.5" DS-DD 135 TPI with 80 Capacity Lockable Storage Box	£44.95
65 3.5" DS-DD 135 TPI with 80 Capacity Lockable Storage Box	£49.95
75 3.5" DS-DD 135 TPI with 80 Capacity Lockable Storage Box	£54.95

OUR 3.5" DISCS ARE **VERY CAREFULLY SELECTED** TO GIVE YOU 100% ERROR FREE PERFORMANCE. EACH DISC IS OFFERED WITH OUR 100% MONEY BACK GUARANTEE AND IS SUPPLIED WITH LABELS

HIGH DENSITY 5.25" DISCS

25 5.25" DS HD 1.6MB plus 50 BOX	£21.99
50 5.25" DS HD 1.6MB plus 100 BOX	£41.99
100 5.25" DS HD 1.6MB plus 100 BOX	£69.99

HIGH DENSITY 3.5" DISCS

10 DS HD 3.5" DISCS	£19.99
30 DS HD 3.5" DISCS	£57.99
50 DS HD 3.5" DISCS	£94.99

BULK BUYERS

100 DSDD 3.5"TPI	£69.99
150 DSDD 3.5"	£100.00
200 DSDD 3.5"	£129.99
500 DS DD 3.5"	£304.99
250 DSDD 5.25"	£64.99
500 DSDD 5.25"	£119.99
1000 DSDD 5,25"	£219.99

PRICE AND QUALITY GUARANTEE

All our Discs are top quality products and are certified 100% error free. Should you ever see a comparable product advertised in this magazine at a lower price we will not match it we will

BEAT IT GUARANTEED

VISA

M.D. OFFICE SUPPLIES

18 CRESCENT WAY, FARNBOROUGH, KENT BR6 9LS

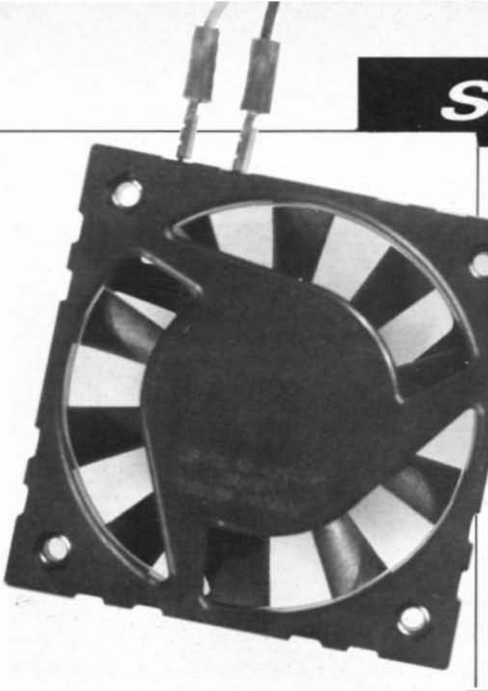
TELESALES HOTLINES: 0689-61400

ACCESS

All prices include VAT and Delivery UK only

Supplied subject to availability. E/OE

THE BEEB BODY BUILDING COURSE



Blowing in the wind

Mike Cook reveals his greatest fan and finds out how not to get hot under the collar

HERE we are in the middle of what passes for summer. The sound of leather on willow, the clink of iced drinks and the slow pitter-patter of the rain. The one thing about the rain in the summer however, is that it is warm. The point of all this meteorological meandering is that now I can expect an increase in the number of people writing in with problems about their micro overheating.

Let's first take a cool look at the problem. Any electronic circuit will generate heat, the amount depending on the number of circuit elements and the technology that made them. For example, Cmos circuits generate much less heat per gate than bipolar TTL circuits.

We have a fair old mix of different technologies in the BBC Micro, so in order to investigate the problem, I looked at the machine using an infra red camera which gives a heat picture – the brighter the object the hotter it is.

I used an infra red TV system and digitised the results using a Watford Digitiser on an Archimedes. For comparison I digitised a picture in visible light from a similar angle. The chips in the heat picture look more like circles of light because even the largest IC is only about 5mm square and the rest is simply plastic to hold the legs together.

You can also see at the left hand side that the label on the power supply is hotter than the metal because the plastic is not able to conduct its heat away to the surroundings as efficiently as metal.

Another feature in the heat picture is the black wiggly lines. These are, in fact, the power leads which are quite cold and are masking the heat from the circuit board behind. When I analysed this picture carefully I found that the hottest object in the micro was not a chip but the large resistor supplying the video ULA. This glowed brighter than the rest although the ULA itself came a close second.

The BBC Micro is designed to be kept cool by natural convection, the warmed air rises and exits through the slot in the back. This causes cool air to be pulled from the front where all the connectors are situated. To this end therefore it is vital that the machine stands proud of the surface. For example if it were placed on a carpeted surface the access to the front would be restricted.

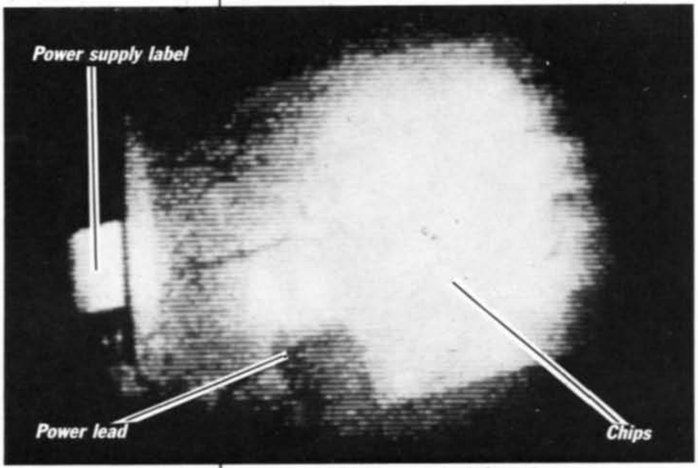
Unfortunately the slot on the back of the micro was narrowed after criticism on safety grounds – it was felt that small fingers could probe inside. This is just the sort of argument that gets safety officers a bad name, as there is absolutely nothing that could harm said small fingers.

It seems strange that children should be protected from five volts when all train sets have great expanses of exposed 12 volt connections. Of course, reducing the slot width will reduce the natural cooling convection currents, so a simple remedy to overheating would be to make this slot wider.

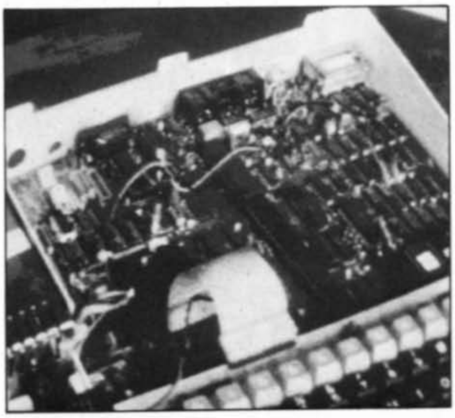
However, the problem is often compounded by two factors. First of all the power supply is often put under a heavy load by powering a disc drive, and secondly there is the problem of add-on boards.

Most of these sit over the top of part of the

Turn to Page 26 ▶



Digitised BBC Micro under infra-red



Digitised BBC Micro under visual light

◀ From Page 24

existing board inevitably reducing the air flow around the circuit as well as generating extra heat itself. Several of these boards coupled with a warm environment produce a recipe for overheating.

Finally, one sign of ageing chips is that they tend to fail at temperature extremes.

When natural convention is not enough we have to force things and fit a fan, but unfortunately most are too large to fit inside a BBC Micro. However I have come across a very thin low voltage fan that will do the job nicely. It is made by Micronel – a Swiss company – it is very quiet and reasonably low powered, taking just under 200mA.

It is quite simple to fit for a case of mild overheating as all we want it to do is to stir up the air a little. If you open your machine you can mount it in the back, left-hand corner of the case. Use sticky-backed foam pads on two sides to fix it in a mid-way position between the top of the case and the circuit board.

In addition, if you don't have Econet fitted, you can push out the hole on the back label to allow extra air to be sucked in. The fan will only work in one direction, so make sure the label is down towards the circuit board so air is thrown up to the lid of the case to make the most efficent use of the circulating air.

There is not much point in fitting a switch to the fan as you want it on whenever the micro is on. It is quite simple to wire up and requires no soldering. The wire connects to the fan with crimped spade connectors, at the other end strip away about 8mm. Remove the spade connectors from the board and push the bare wire up one of the curled sides.

Then refit it making sure that all the wire is covered by the insulating sleeve and that no strands are poking out. Make sure the fan is the right way round electrically – the +ve connector going to the red wire and the -ve to the black. To prevent you getting them back on the board the wrong way round it is best to make these connections one at a time. Now whenever you switch the machine on the fan comes on too. The noise you hear is simply the air being shifted, the fan being virtually silent.

For severe cases of overheating there is nothing for it but to mount the fan properly on the lid. Being just over 14mm thick, it can be placed virtually anywhere without fouling but if you have any extension boards your choice will be a little more limited. The best bet is to fit it as close to the back as possible, again the top left hand corner is favourite.

Drill four 1/8in fixing holes on a 5cm square and countersink them on the outside of the lid. Now you can use your skill to drill out a collection of small holes in this ring. Again a good size is 1/8in or just smaller is ideal to allow sufficient air but not the entry of screwdrivers. Attach the fan with 6BA countersunk bolts.

Now the question of whether to suck or to blow: In general you get better results if the fan sucks air from your computer then you can use natural ventilation areas to input cool air. This is also a slightly cleaner solution as the dirt dragged into the micro will be distributed and not concentrated under the fan. However, if you prefer to blow air you must fit a filter, which adds slightly to the clearance you need under the lid. Whatever method you use the micro will certainly not suffer more from overheating problems.

BEEB BODY BUILDING PACK ORDER FORM

Body Build Packs:

☐ **Pack 53** – *Cooling Fan Kit 5 volt slim-line fan with crimped connecting cable Price £24.15*

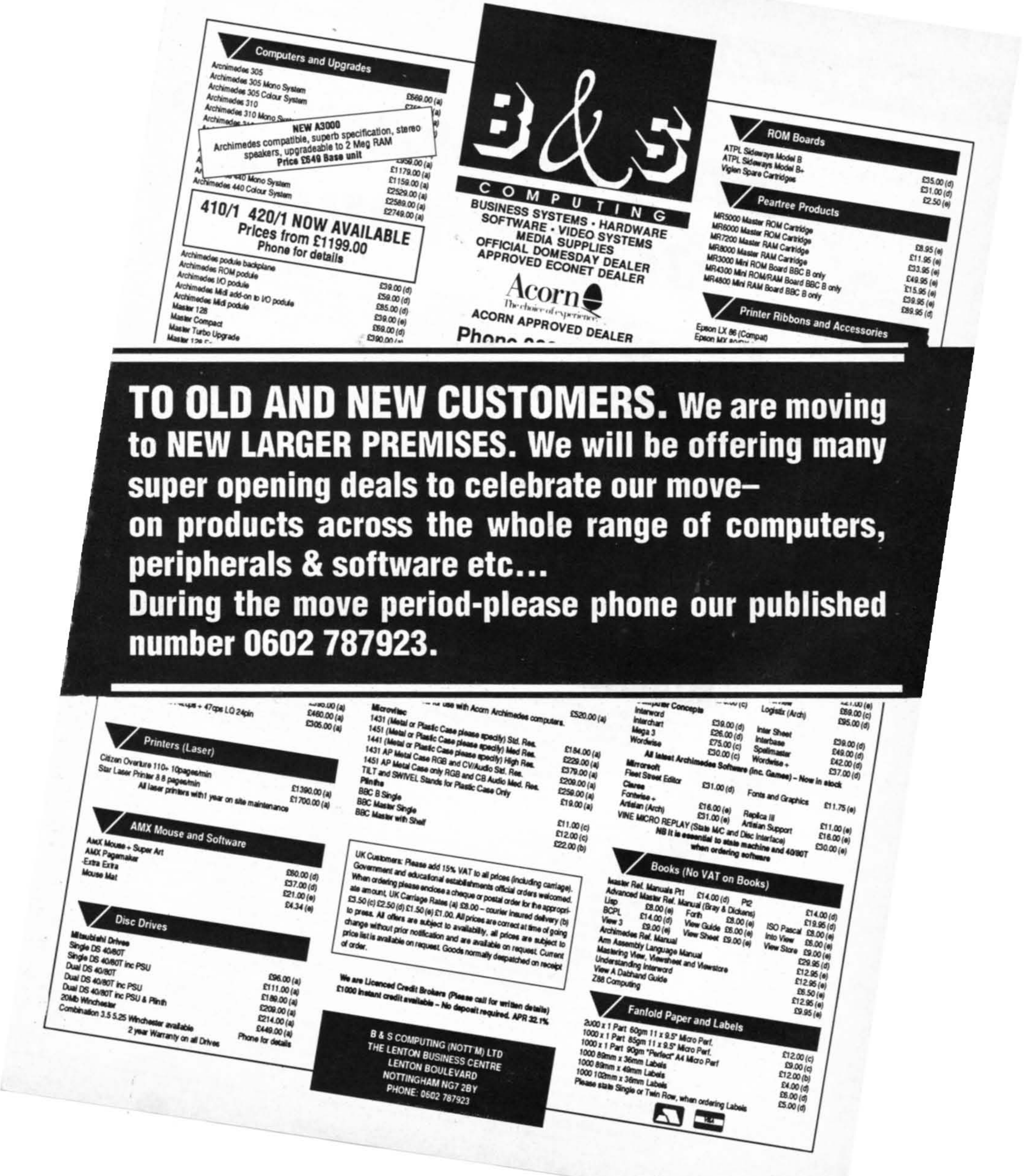
Name ....
Address................................
....
....
Post code ....

All prices include VAT and P&P

Educational establishment orders accepted.

Make cheques payable to Musbury Consultants and send to: 8 Fairhill, Helmshore, Rossendale, Lancs BB4 4JX.

Foreign orders add £3.00 if airmail delivery is required.



Computers and Upgrades

Archimedes 305
Archimedes 305 Mono System
Archimedes 305 Colour System
Archimedes 310
Archimedes 310 Mono Sys
Archimedes 440 Mono System
Archimedes 440 Colour System

£569.00 (a)
£959.00 (a)
£1179.00 (a)
£1159.00 (a)
£2529.00 (a)
£2589.00 (a)
£2749.00 (a)

NEW A3000
Archimedes compatible, superb specification, stereo speakers, upgradeable to 2 Meg RAM
Price £649 Base unit

410/1 420/1 NOW AVAILABLE
Prices from £1199.00
Phone for details

Archimedes podule backplane
Archimedes ROM podule
Archimedes I/O podule
Archimedes Midi add-on to I/O podule
Archimedes Midi podule
Master 128
Master Compact
Master Turbo Upgrade
Master 128 C

£39.00 (d)
£59.00 (d)
£85.00 (d)
£39.00 (e)
£69.00 (d)
£390.00

B & S COMPUTING

BUSINESS SYSTEMS · HARDWARE
SOFTWARE · VIDEO SYSTEMS
MEDIA SUPPLIES
OFFICIAL DOMESDAY DEALER
APPROVED ECONET DEALER

Acorn
The choice of experience
ACORN APPROVED DEALER

Phone

ROM Boards

ATPL Sideways Model B	£35.00 (d)
ATPL Sideways Model B+	£31.00 (d)
Viglen Spare Cartridges	£2.50 (e)

Peartree Products

MR5000 Master ROM Cartridge	£8.95 (e)
MR6000 Master ROM Cartridge	£11.95 (e)
MR7200 Master RAM Cartridge	£33.95 (e)
MR8000 Master RAM Cartridge	£49.95 (e)
MR3000 Mini ROM Board BBC B only	£15.95 (e)
MR4300 Mini ROM/RAM Board BBC B only	£39.95 (e)
MR4800 Mini RAM Board BBC B only	£89.95 (d)

Printer Ribbons and Accessories

Epson LX 86 (Compat)
Epson MX

TO OLD AND NEW CUSTOMERS. We are moving to NEW LARGER PREMISES. We will be offering many super opening deals to celebrate our move– on products across the whole range of computers, peripherals & software etc...

During the move period-please phone our published number 0602 787923.

cps + 47cps LQ 24pin

£460.00 (a)
£305.00 (a)

Printers (Laser)

Citizen Overture 110+ 10pages/min	£1390.00 (a)
Star Laser Printer 8 8 pages/min	£1700.00 (a)

All laser printers with1 year on site maintenance

AMX Mouse and Software

AMX Mouse + Super Art	£60.00 (d)
AMX Pagemaker	£37.00 (d)
-Extra Extra	£21.00 (e)
Mouse Mat	£4.34 (e)

Disc Drives

Mitsubishi Drives

Single DS 40/80T	£96.00 (a)
Single DS 40/80T inc PSU	£111.00 (a)
Dual DS 40/80T	£189.00 (a)
Dual DS 40/80T inc PSU	£209.00 (a)
Dual DS 40/80T inc PSU & Plinth	£214.00 (a)
20Mb Winchester	£449.00 (a)
Combination 3.5 5.25 Winchester available	Phone for details

2 year Warranty on all Drives

for use with Acorn Archimedes computers. £520.00 (a)

Microvitec

1431 (Metal or Plastic Case please specify) Std. Res.	£184.00 (a)
1451 (Metal or Plastic Case please specify) Med Res.	£229.00 (a)
1441 (Metal or Plastic Case please specify) High Res.	£379.00 (a)
1431 AP Metal Case RGB and CV/Audio Std. Res.	£209.00 (a)
1451 AP Metal Case only RGB and CB Audio Med. Res.	£259.00 (a)
TILT and SWIVEL Stands for Plastic Case Only	£19.00 (a)

Plinths

BBC B Single	£11.00 (c)
BBC Master Single	£12.00 (c)
BBC Master with Shelf	£22.00 (b)

UK Customers: Please add 15% VAT to all prices (including carriage). Government and educational establishments official orders welcomed. When ordering please enclose a cheque or postal order for the appropriate amount, UK Carriage Rates (a) £8.00 – courier insured delivery (b) £3.50 (c) £2.50 (d) £1.50 (e) £1.00. All prices are correct at time of going to press. All offers are subject to availability, all prices are subject to change without prior notification and are available on request. Current price list is available on request. Goods normally despatched on receipt of order.

We are Licenced Credit Brokers (Please call for written details) £1000 instant credit available – No deposit required. APR 32.1%

B & S COMPUTING (NOTT'M) LTD
THE LENTON BUSINESS CENTRE
LENTON BOULEVARD
NOTTINGHAM NG7 2BY
PHONE: 0602 787923

Computer Concepts (c)
Interword £39.00 (d)
Interchart £26.00 (d)
Mega 3 £75.00 (c)
Wordwise £30.00 (c)

Logistix (Arch)
Inter Sheet
Interbase
Spellmaster
Wordwise +

£59.00 (c)
£95.00 (d)
£39.00 (d)
£49.00 (d)
£42.00 (d)
£37.00 (d)

All latest Archimedes Software (inc. Games) – Now in stock

Mirrorsoft
Fleet Street Editor £31.00 (d)
Clares
Fontwise + £16.00 (e)
Artisian (Arch) £31.00 (e)
Fonts and Graphics £11.75 (e)
Replica III £11.00 (e)
Artisian Support £16.00 (e)
VINE MICRO REPLAY (State M/C and Disc Interface) £30.00 (e)

NB It is essential to state machine and 40/80T when ordering software

Books (No VAT on Books)

Master Ref. Manuals Pt1	£14.00 (d)
Pt2	£14.00 (d)
Advanced Master Ref. Manual (Bray & Dickens)	£19.95 (d)
Lisp	£8.00 (e)
Forth	£8.00 (e)
ISO Pascal	£8.00 (e)
BCPL	£14.00 (d)
View Guide	£6.00 (e)
Into View	£6.00 (e)
View 3	£9.00 (e)
View Sheet	£9.00 (e)
View Store	£9.00 (e)
Archimedes Ref. Manual	£29.95 (d)
Arm Assembly Language Manual	£12.95 (e)
Mastering View, Viewsheet and Viewstore	£12.95 (e)
Understanding Interword	£6.50 (e)
View A Dabhand Guide	£12.95 (e)
Z88 Computing	£9.95 (e)

Fanfold Paper and Labels

2000 x 1 Part 60gm 11 x 9.5" Micro Perf.	£12.00 (c)
1000 x 1 Part 85gm 11 x 9.5" Micro Perf.	£9.00 (c)
1000 x 1 Part 90gm "Perfect" A4 Micro Perf	£12.00 (b)
1000 89mm x 36mm Labels	£4.00 (d)
1000 89mm x 49mm Labels	£6.00 (d)
1000 102mm x 36mm Labels	£5.00 (d)

Please state Single or Twin Row, when ordering Labels

B B+ M

So you want to be famous?

The Mad Hatter has sage advice for writers of adventure games

MANY would-be adventure game authors send me their efforts for assessment, and while I'm not advertising myself as a sounding board, by following a few simple rules contributors would stand a good chance of getting a response of some sort. And ignoring too many of them will lower their chances considerably.

Of primary importance, send your offering on disc, not tape. Tape loading is not 100 per cent reliable, even with commercial products. Not only that, a disc saves about five minutes of precious time.

It is most important that someone who is not familiar with your masterpiece has play-tested it first. Can you guess the effect it has on me to meet an irritating bug within a couple of minutes?

And don't just send me a disc with the challenge: "This is the hardest adventure known to humankind and I bet you'll never solve it". People want adventures that *can* be solved, and I want to see the full solution in order to understand how the puzzles are put together and thus make a proper evaluation.

If I'm going to work out whether you have something marketable I don't want to waste my time trying to solve what – to me – may seem an unnecessarily difficult problem.

Why am I telling you all this? Well, I recently came across an adventure sent in by a reader that I have had no hesitation in recommending for commercial production and marketing – and even then, I had some criticisms to make. The author, however, fulfilled all the conditions I have just mentioned one way or another, and so if all goes well you'll be seeing something released in the autumn.

For the moment, things such as author, game title and software house need to be kept a secret: One thing I promise, you won't be disappointed.

See you next month. Until then, happy adventuring.

Having an ice time

Let's continue our excursion into **Lords of Time** with the Ice Age, the second era to explore, and while Eric Clapton's Tulsa Time is keeping my blood circulating happily as I write. I have to confess that you'll need something more than music if you are to survive the snowy wastes.

So make sure that you have the following equipment from the first time zone before you turn cog two and swing the pendulum to let you out: Spear, petrol can, matches, candle, cat food, tin-opener and the pickaxe.

When you have found the woolly mammoth by the bundle of wood, pour the petrol from the can, light the match and then the petrol. The mammoth will jump out of its skin leaving behind a tusk – marked with the hourglass sign – and the fur coat which is your protection against the cold.

When you get to the armchair hollow in the mountainside LIGHT the candle using the match from the mammoth encounter and collect the meaty bone. Your next customer is the sabretooth tiger. Open the tin and give him the cat food to befriend him, and then PULL TOOTH to get him out of his misery. You will need the tooth back in the first time zone.

In the freezing cave you must SHOUT in order to make the icicle drop and then you should take it. Now go to the silver fox lair and give the fox the meaty bone. Continue by moving E to the silver-veined cave and use the pick to HACK at the wall of ice. The hole you make will enable you to move S and collect the silver candelabra.

Return to the silver fox lair and proceed S to the frozen forest and the lake. It took me quite a while to figure out that I had to THROW the icicle here to freeze the lake. Make your way across the lake to the miniature throne room where you should use the pick again on the cube of ice to obtain the sword.

Go into the icy water – or icy tunnel in the newer version – and thus make your way back to the clock. Once there enter the first time zone and go to the compost heap. EXAMINE the heap once to produce the coin but do not attempt to take it at this stage.

Instead, EXAMINE the heap again and then EAT one of the mushrooms so as to reveal the fairy – which would like the tiger's tooth. Now you will get the coin but you must bargain a little harder still, so that you are offered a firefly – which you should accept, since this is your permanent source of light.

Now you can return to the clock via the pit in the carport and prepare yourself to tackle the third time zone – The Dinosaur Age. Again, beginners to adventuring should notice that there is usually a permanent light source – like the firefly – to be found somewhere in the better games, but it is not always available so early on.

Not so boring?

No doubt Tolkein purists purse their lips prissily at the antics of that glorious spoof adventure **Bored of the Rings** by Silversoft, but it has delighted and frustrated many a reader of this hallowed column. However, the frustration element has tended to outweigh the delight for some of you, and so the time has come to lay bare most of its secrets.

In many ways the game is a faithful reproduction of the book *Lord of the Rings*, so far as locations are concerned, at any rate, and readers familiar with the story will readily recognise their surroundings and even be able to work out some of the appropriate responses to problems.

That's not the case with all the puzzles however, as you'll soon see. You start off in the tent located in the party field and need to hang about a bit here, so WAIT twice before proceeding West until you come to Fag End. There you must WAIT again until you have been given the Ring. Now you can set out on your travels accompanied by faithful Spam the gardener and your boggit friends Murky and Pimply.

Go East twice, South twice and then HIDE from the Riders until it is safe to go North to the Triffid Farm where, if you want a laugh, you should enter and have a drink of ale. After that – or straightaway if you are teetotal – go on North three times and then four East to the hedge. Here go Down and East through the tunnel into the Old Forest.

North twice will put you safely into the clutches of the tree, where you need to CRY HELP to get Tim Bombadul – a lad full of beans if ever I saw one – and then East three times to Tim's shack. Now go South twice into the Downs and you'll encounter the barrow wight: ASK CLUE here, make a note of it and then move W, W and N on to the Great East Road.

East takes you to Whee, and here you must move In and In again, so that you can meet Arrogant in the Puny Prancer and enable him to join you in the quest. East from Whee is a signpost and a single move East after that brings you to one of the main sources of trouble readers encountered in Part I of Bored of the Rings.

There is an unflagged exit North here to a mountain and you then go Up to obtain the pepper which is essential to finishing this part of the adventure. However if you get there too quickly you won't find it, since there is a move counter at work in the game – hang about as necessary, trying to move North and then Up every so often.

Newcomers to adventuring should note that from time to time this device of the hidden exit is used as a puzzle. While really good adventures don't use it all that often, begin to suspect there's

Turn to Page 30 ►

> ‘In many ways the game is a faithful reproduction of the book Lord of the Rings so far as locations are concerned’

Mysteries solved

I have managed to find out a little more about the mystery ships which have been puzzling us all in **Elite**. First some negative information, which nevertheless clears up one of the mysteries. May I remind readers that these mystery ships cannot be found in either the tape or disc versions for the unexpanded BBC Micro.

Right, now to business. There are *no* such things as Generation Ships. I know, I know – I've been calling one of the mystery ships just that, but even I can be wrong on rare occasions.

The next thing to notice is that Space Dredgers *can* be found in Galaxy Seven. However, they only appear extremely rarely and there's no particular planetary system where they are to be located. Still a 40-mile long spaceship must be quite a sight. I shall be interested in hearing news of them – and a description.

Finally we turn to that mystery ship which is as tough and fast as a *Constrictor*, which doesn't appear on the radar screens nor figure in the identification charts. This is the ship which I have been wrongly referring to as a Generation Ship. Messrs Bell and Braben are keeping very mum about what it is and why it is there. At least we know it can only be destroyed with difficulty. Perhaps it was part of a prototype mission.

◀ From Page 29

> *Whatever you do, remember to save your position, since some experiments may well prove fatal*

one about if you find yourself unable to move to any new locations after a while. Another clue is what happened to a number of readers of this column – they got to the end of Part I but were left without the vital ingredient needed to open the Morona Gate.

The best antidote when you begin to suspect a hidden exit is to go to somewhere like the Great East Road where, ostensibly, you can only move in two directions and then try all the directions possible. You might well then find that there are more exits than indicated by the location description. It may be tedious, but occasionally you'll hit the jackpot.

The other solution is to see if there is something which will reveal the existence of hitherto invisible exits. Try wearing a ring, rubbing it, drinking a potion, wearing special spectacles rubbing your eyes with ointment, and so on.

In the Level 9 adventure **The Price of Magik** you needed to rub your eyes with a substance called eyebright in order to be able to see in the dark. Whatever you do, remember to Save your position first since some of these experiments may well prove fatal.

There, tutorial time is over, so back we go to the Great East Road. After getting the pepper, continue East along the road, past the Tollbridge to Rivendull: Here you must go in to get the rest of your party. You'll find Bimbo, Smelrond, Grandalf, Giblet, Legoland and Borrower waiting for you.

When you leave Rivendull, go E to the crows and then S to the wolfs – yes, wolfs – E twice to the dam and finally N and E to the ledge. One more move E takes you to the Gate of Morona and here you DROP PEPPER to get the password for Part II: Psychoanalysis. Please note that it is essential to enter Psychoanalysis correctly, using upper and lower case letters as indicated.

More next month.

VOLTMACE

Archimedes
COMPATIBLE

COMPATIBLE

● DELTA 3B TWIN

DATAPAD 16B
£39.95

16 Way keypad
Metal case
Software allows the keys to be defined
Fits onto the user port

NEW! For The Archimedes
DELTA - CAT MOUSE ELIMINATOR
The Delta-Cat is a joystick which plugs into the mouse port on the Archimedes keyboard. A small deflection of the joystick is like moving the mouse slowly.
A large deflection simulates moving the mouse fast. Release the stick and it springs to off. £29.95

FOR A BBC A, B, B+, MASTER, ARCHIMEDES & ELECTRON PLUS 1
DELTA 3B TWIN – £21.95
2 joysticks wired to one plug.
As with all our joysticks they have the fast action sprung to centre return of the steel shafted nylon covered joystick. The light action makes them ideal to hold and the 3 fire buttons allow left or right-handed use.

DELTA 3B SINGLE £14.95
A single joystick that in some ways can act as two. The custom made potentiometers are wired so that it will work as a left hand or right hand joystick. It can run some programs written for two joysticks and has two independent fire functions.

SPECIAL OFFER:
We have acquired a few more Cumana Touchpads, absolute giveaway at £14.95

TEAC 40/80 TRACK SWITCHABLE 5.25" DISC DRIVES

Bare Drives fitted with a switch on the front	£80.00
As above, cased with BBC leads	£95.00
As above, with power supply	£115.00
Archimedes bufferred interface with back plate assembly	£39.95
Watford D/D DFS kit	£44.85
DFS Manual	£6.95

REPLACE 5.25" DRIVES WITH 3.5"

Panasonic 400/800k grey fronted 3.5" DS Drives on Carrier plates to replace 5.25" Drives	£80.00

ACCESS

All prices include VAT + P&P
Joysticks are available from
your dealer or direct from us on
(0462) 894410
Special offers only available direct

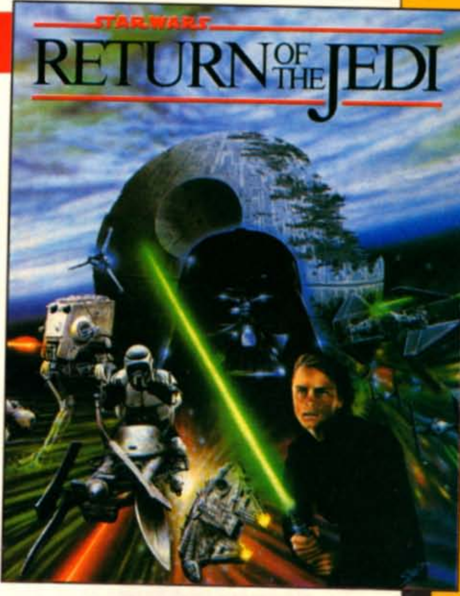
VISA

Unit 9, Bondor Business Centre, London Road, Baldock, Herts. SG7 6NG. Telephone (0462) 894410

SOFTWARE SCENE

Return of the Jedi ... the final conflict

Price: £11.95 (disc) £9.95 (tape)
Supplier: Domark, Ferry House, Lacey Road, London SW15 1PR.
Tel: 01-780 2224



RETURN of the Jedi is the third and probably final offering in the Star Wars series of films, and also the latest arcade game conversion from the Star Wars license holder, Domark.

As with the previous offerings, the game is inspired by three different scenes from the film. Unlike the first two, the rather coarse but colourful Mode 5 graphics have been replaced with a two colour but higher resolution Mode 4 display. The effect is preferable to the earlier efforts.

The title screen is hi-res, colourful and accompanied by an up tempo little number. However, once into the game proper the sound effects are limited to the simplest of beeps and explosions.

When we last saw Luke and Leia they were running towards a pair of speeder bikes. Leaping astride her hovering steed, Leia makes a dash for the cover, if not safety, of the forest. Coded with smooth diagonal scrolling, you can move the speeder in any of four directions as you weave your way through the ever increasing number of trees.

Enemy activity takes the form of Imperial troopers attacking in pairs on their own speeders. On the lower levels these chaps are easy to dismount – a combination of rapid acceleration and braking will soon have a tailgating trooper floundering in your gun sights.

On the higher levels you will find yourself falling for the same routine. Alternative tactics involve running the unwary opponent smack into a tree, or enlisting the help of the friendly Ewok population.

The Ewoks – no lovers of Imperial troopers – lay in ambush at various points along your route. Grasping both ends of a trip wire these Care Bear lookalikes allow the first rider to pass unharmed then quickly tighten the wire in order to unsaddle – but more likely decapitate – the pursuing trooper – just make sure that you're the first one through.

Even more dastardly is their log crush routine – two bears, two logs, and a narrow gap between them. The skilful player will flash through this gap leaving one pureed trooper in his wake. I avoided this second type of ambush since I had a nasty habit of misjudging the gap myself.

Safely at the Ewok village the action switches to scene number two and three and one again. To be honest I wasn't 100 per cent certain which scene was which, since the program switched between them quite frequently. In all instances the software employs the same diagonal scrolling routine from scene one but with a change of sprites and background.

At the helm of the Milleneum Falcon, Lando Calrissian heads for the Death Star pursued by TIE fighters. Success on this section revolves around your ability to remember the safe route through the labyrinth of tunnels and move onward to face the challenge of the armada of Imperial Star Cruisers, fighters and shuttles.

The size of the enemy cruisers and the presence of large numbers of smaller craft tends to give this scene a claustrophobic air – there is just too much going on.

Interwoven with Lando's escapade is Chewbacca's journey through the forest aboard a Scout Walker. Lumbering relentlessly onwards you guide the walker around the stationary log piles, blast the pieces of rolling lumber and dodge boulders catapulted from the sidelines.

Once again the scene has a rather clumsy feel to it, as though it had been hurriedly completed in an effort to meet a deadline. It has none of the polish that is evident in the first scene.

An irritating feature is the scoring system. Your current points total is displayed on screen at all times during your valiant struggle against the Empire. However, since you are concentrating solely on staying alive you have little time to glance at the score.

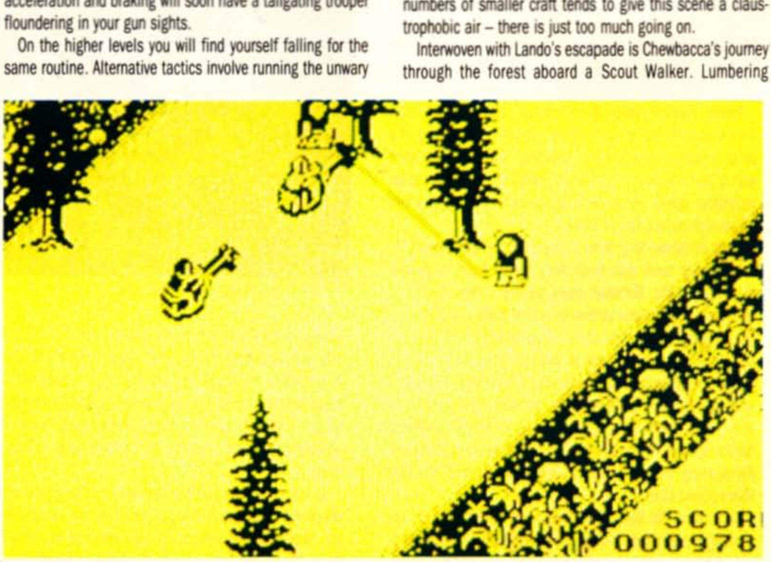
When the inevitable happens and you go to meet that great Jedi in the sky you are immediately returned to the starting screen. The only score on show here is that of some guy called Sam who scored close on 700,000 – there is no high score table, or even a record of the previous game's total.

As with previous Star Wars games, you are given a choice of three degrees of difficulty on which to start – these correspond to levels one, three and five respectively. You are awarded a suitably sized bonus for the successful completion of your selected level.

The Return of the Jedi is a game that starts off as a winner but finishes as an also ran.

Jon Revis

Sound	***5***
Graphics	***7***
Playability	***6***
Value for money	***7***
Overall	***7***



You can lead your enemy into an Ewok trap

Holed Out ... much faster, better

Price: £19.95
Supplier: The Fourth Dimension, PO Box 4444, Sheffield.
Tel. 0742 700661.

IN the June issue of *The Micro User* Holed Out for the BBC Micro was described as "a test of skill not to be missed". The same game has now been released for the Archimedes and it is quite a stunning piece of work, ranking with Zarch and Conqueror in quality.

The game is very similar, although control is via the mouse. You start by selecting the number of players, their skill levels, whether right or left handed and so on, plus which of the two courses you want to play.

There are two types of game – match or stroke. In the former you play to win holes while in the second you're aiming for the lowest number of strokes.

Once on the first tee the differences from the 8 bit BBC Micro version become obvious – more colours, finer detail, much faster display update and the controls are at the top rather than down the side.

You select the required club using the mouse, then take a swing. Animation of the golfer is very smooth and detailed – and to my inexperienced eye looks perfect, copied from a book on golfing perhaps?

You can follow the ball's flight by its shadow on the ground – its size shrinking slowly as it gets further away. And so it goes on until the ball is potted. Of course there are problems like bunkers, trees and water.

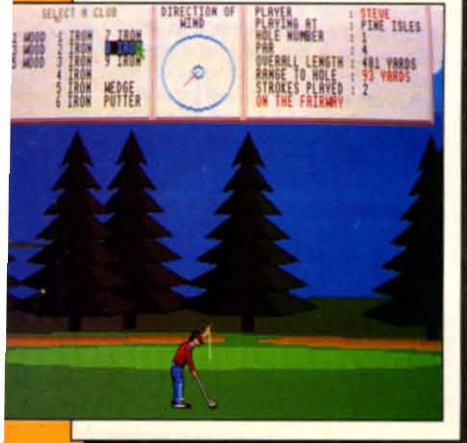
The graphics are effective and have amusing little touches like the ripples when the ball hits water and sand flying into the air when you are trying to get out of a bunker.

The sounds are all digitised and include the swing, the ball travelling through trees, a very meaty *plop* for landing in water and the classic rattle as the ball goes down the hole.

The basic gameplay is identical to the 8 bit BBC Micro but it's much faster and makes a great game.

Lazarus

Sound	9
Graphics	9
Playability	9
Value for money	9
Overall	9



Play it Again Sam 9 ... easy does it

Price: £11.95 (disc) £9.95 (tape)
Supplier: Superior Software, Regent House, Skinner Lane, Leeds LS7 1AX.
Tel: 0532 459453

PLAY it again Sam 9 could probably be best described as the Superior collection for the more sedentary gamester. Consisting of three arcade adventure games and a snooker simulation, it is hardly the most exhilarating of compilations.

First is **Spycat** – a tongue-in-cheek tale of espionage and intrigue in the corridors of power. After 50 years of loyal service Spycat hears rumours concerning his forthcoming retirement – due to government cut-backs his comfortable pension is to be slashed. Angered by the thought of this enforced poverty, Spycat decides to take out a little insurance in the form of three top secret research documents.

Your mission is to help Spycat locate the documents, transfer them to microfilm, obtain all the relevant travel papers to go to Greenland, fly there and write his memoirs and probably have them banned by the government.

Despite limiting himself to four colours, the programmer has managed to create a series of cartoon-like characters and backdrops – Spycat is a superb Paddington Bear lookalike with a penchant for exposing himself when ignored for a few minutes.

Snooker is a pastime that has yet to be successfully implemented on the game screen and **Steve Davis's Snooker** is the epitome of all that is wrong with the genre. The balls are far too small to allow for accurate judgement of angles and the micro is unable to keep track of a large number of moving balls and as a result the speed of animation increases and decreases according to the amount of onscreen activity. Finally the game is played in complete silence and the micro-operated opponent plays the most impossible of shots with uncanny accuracy.

Having reviewed the excellent 3D Pool from Firebird in the July issue of *The Micro User* I was even more disappointed with this feeble excuse for a snooker simulation. Sam should have left this one in his attic.

Number three involves that mainstay of the Superior stable – **Repton**. Starring in his autobiography – The Life of Repton – our green-skinned buddy must negotiate 40 testing screens of fiendish action.

Based around the classic Repton 3 program the new collection of screens calls upon the different stages of Repton's life as a source of inspiration. The traumas of infancy form the basis of the first eight. In his search for the missing teddy bears Repton junior is hounded by monster dogs and likely to be crushed by the tumbling Humpty Dumpties.

Many lives will be lost in your first few attempts, due to a lack of familiarity with the new game characters. In order to help you through this transitional period Superior has thoughtfully provided a character comparison chart, using which you can determine which of the new characters corresponds to the eggs, diamonds, boulders and so on... before you do something silly.

The subsequent stages of Repton's life story include an ageing reptile.

Repton's strength never was its graphical excellence – the

Play it Again Sam 10 ... cocktail of games

Price: £11.95 (disc), £9.95 (tape)
Supplier: Superior Software, Regent House, Skinner Lane, Leeds LS7 1AX.
Tel: 0532 459453

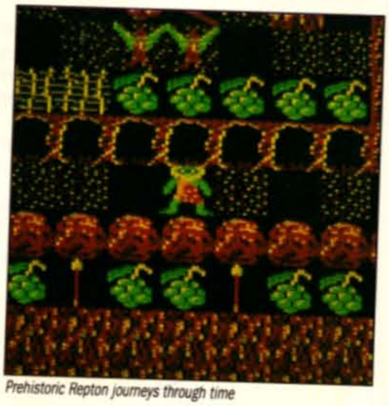
SO Sam finally gets to double figures with Zalaga from Aardvark, 3D Dotty by Blue Ribbon, the ubiquitous Repton with his time travels and a brand new game called Qwak.

Zalaga, a typical classic shoot-'em-up, is an early work from the keyboard of the acclaimed Orlando and is something of a cross between Galaxians and Galaforce. You start each level with a blank screen on to which streams of aliens pour at an incredible speed. By positioning yourself correctly you can dispose of quite a few of them.

Once on screen they form themselves in a traditional pattern moving back and forth then diving down in groups dropping bombs. Between every second screen there's a challenge where aliens stream on not on collision course and not dropping bombs. You shoot as many of them as possible and get a bonus depending on your success rate.

But while Zalaga is fast, colourful and furious, the good-sized sprites tend to flicker and, although I've made it to level three, you'll need to be a really dedicated keyboard basher to want to play it a lot. The sound is pretty good and the opening tune is typical of Orlando's skill with the BBC Micro sound chip.

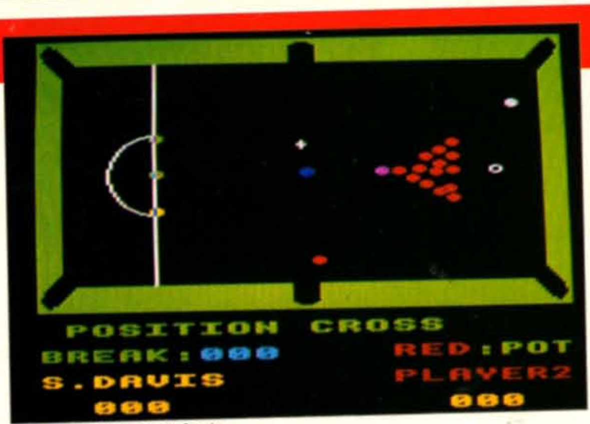
Next up is **3D Dotty**. I'd never seen it before and was pleasantly surprised. You are presented with a three dimensional layout consisting of three floors not unlike a multi-storey car park with the floor missing.



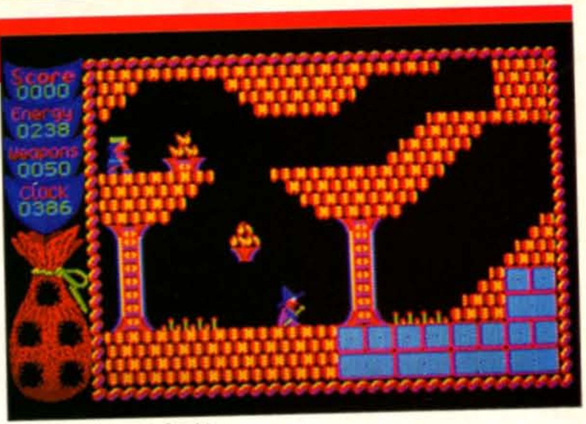
Prehistoric Repton journeys through time

Small white dots fill the entire floor surface and all your little figure – a sort of Pac-man with legs – has to do is go round and chomp all the dots. However, things are not that simple – are they ever? There are three highly mobile fungi which stream across the floor, contact with which drains your energy.

So you run across the floor surfaces avoiding the fungus – which will chase you – trying to get every dot, some of which are hidden behind pillars. For your defence you only have three blocks that will prevent the fungus following you so



Take a break in Steve Davis's Snooker



King Arthur on his quest in Camelot

characters are still blocky and the screen scrolling flickers. The game's forte has always been its strategic content: Each virgin screen conceals unknown terrors for the unwary player. You are always aware that a single misplaced boulder can render a screen completely unplayable.

The Life of Repton is by far the best program in this latest compilation – it even includes the screen designer utility.

Sam's final offering is a classy, colourful and previously unknown arcade adventure called **Camelot**. Playing without the aid of instructions, I had to guess at the objectives, but they would appear to revolve around King Arthur's search for a series of objects.

This quest is hampered by the imposition of a time limit and the fact that nobody appears to respect a king any more – the castle is overrun with witches, devils and enemy knights.

As King Arthur you have a single life, the duration of which is determined by the state of his energy levels. Physical hazards such as fire, water and banks of vicious-pointed spears place a tremendous strain on your wellbeing and are best avoided.

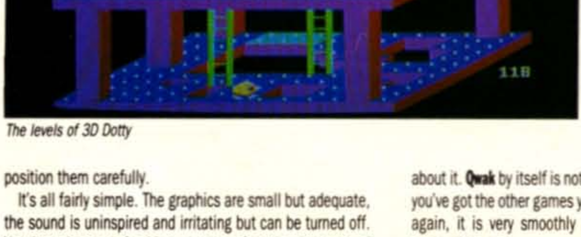
You are armed with a zapper so are able to wipe out most of your enemies – until you run out of zap. The meagre 50 rounds you begin with are soon expended and new supplies are tricky to locate. On the positive side, your rapidly-diminishing energy reserves can be replenished by opening one of the treasure chests.

First rate graphics and difficult gameplay make Camelot a suitable challenge for even the most accomplished arcade adventurers.

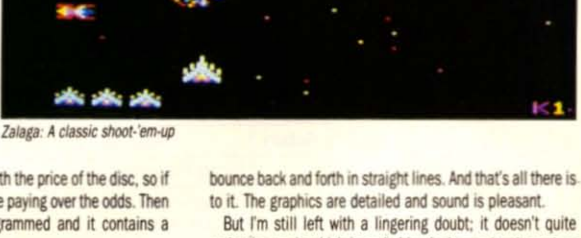
If you are looking for a compilation that gets away from the frenetic keyboard bashing of the Firetrack and Galaforce variety get yourself a copy of Sam volume 9. With the exception of Mr Davis's contribution, good old Sam's done it again.

Jon Revis

Sound	5
Graphics	8
Playability	8
Value for money	8
Overall	8



The levels of 3D Dotty



Zalaga: A classic shoot-'em-up

position them carefully.

It's all fairly simple. The graphics are small but adequate, the sound is uninspired and irritating but can be turned off. Yet it makes a refreshing change after the stresses of Zalaga.

Repton Thru Time hardly deserves a mention – you get the game, the 40 screens and the editor. Apart from that it's just more Repton 3 fun, but we've seen it all before too many times. Sound and graphics are what you've come to expect.

I've left the new release until last partly to develop a feeling of suspense and partly because I'm in two minds about it. **Qwak** by itself is not worth the price of the disc, so if you've got the other games you're paying over the odds. Then again, it is very smoothly programmed and it contains a touch of humour.

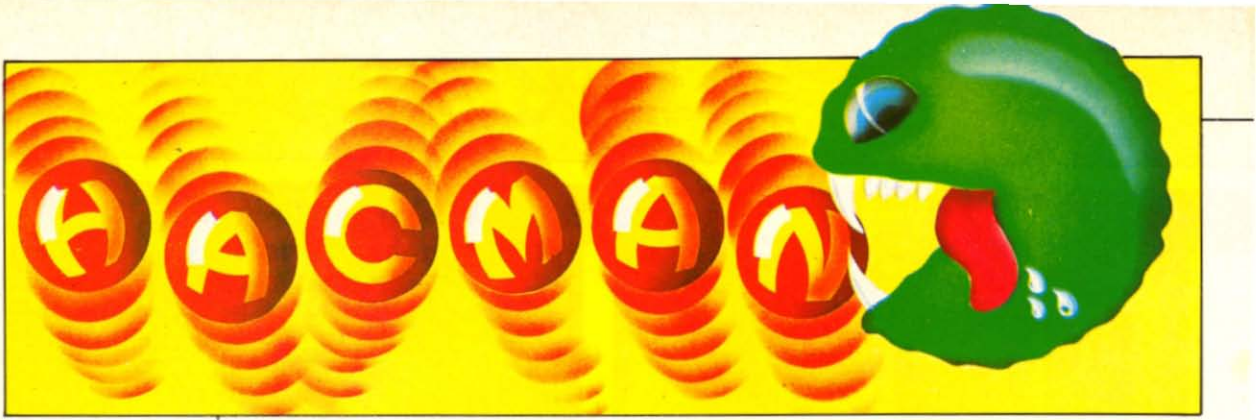
You control Qwak, a little duck, in a simple "collect all the keys on a screen to exit" type game. You can move left, right and jump as well as send forth a bubble to dispose of baddies. However completing a screen peacefully without bubbling a baddie earns you a bonus.

You also get points for various other objects picked up and collecting seven flowers gives you an extra life. The baddies bounce back and forth in straight lines. And that's all there is to it. The graphics are detailed and sound is pleasant.

But I'm still left with a lingering doubt; it doesn't quite make the grade which is probably why it wasn't released on its own.

Lazarus

Sound	7
Graphics	7
Playability	8
Value for money	9
Overall	8



Hac Man reveals some of Galaforce's secrets

Smart cheat that goes a bomb

GALAFORCE is a name much respected by shoot-'em-up fans, and its successor Galaforce 2 has only enhanced that reputation. I recently received a letter from John Ramsey of Greenock, Scotland, who says that Galaforce 2 contains a very useful feature not documented in the instructions. Press Shift during play and you release a smart bomb that will destroy almost all the aliens on the screen in one go.

The only adversaries that appear immune to the blast are the giant twin-sectioned rock-spitting aliens that first appear at the end of Galaxy Four – because all the aliens have a hit point rating.

A smart bomb inflicts approximately six points of damage, which is more than enough to destroy the majority of the aliens, which typically have only one, two or occasionally three hit points. The large twin-sectioned aliens, however, have a rating of more than 30 for each half, so a smart bomb will not do enough to destroy one outright.

A smart bomb will also destroy all the large aliens' meteorites currently onscreen. This effect is particularly useful because the rocks released by the big aliens can themselves fire laser bolts. Be careful.

Your current quota of smart bombs is indicated by the number of encircled Z symbols in the bottom right-hand corner of the screen next to the display of your remaining ships. You start off with just one, but more are contained in some of the alien capsules that appear. Of course, the capsule might have an unpleasant side effect, but unless you're keeping track of what's coming next, that's a chance you have to take.

As mentioned in the instructions supplied with Galaforce 2 the capsules appear in a precise order throughout the game. However, the full sequence spans 16 galaxies and is not easily learned. Nevertheless, for the benefit of anyone who may be tying themselves up in knots trying to work it out, the exact sequence in which the capsules appear – courtesy of author Kevin Edwards – is below. The numbers in the list refer to the galaxy in which each capsule appears –

SCR 880 HI 30000

Galaxy	Feature
1	Extra firepower
2	No up-down movement Smart bomb
3	No capsules
4	1,000 point bonus Smart bomb
5	Rapid firepower Slow ship movement
6	1,000 point bonus 1,000 point bonus
6 (cont)	Reverse controls
7	Extra firepower Extra life
8	No capsules
9	Explosive container 1,000 point bonus
10	Extra life No firepower
11	Extra firepower No horizontal movement
12	1,000 point bonus Smartbomb
13	Slow ship movement
14	1,000 point bonus 1,000 point bonus No firepower Smart bomb
15	Smart bomb Extra firepower
16	Protective shield

The sequence in which the capsules appear

Featuring:

Galaforce 2
Syncron
Impact
Elite

most feature more than one but some are devoid of collectable goodies. The pattern of capsules released in each successive set of 16 galaxies follows the pattern of the first group.

There is a distinct difference between the extra and rapid firepower capsules described above. Extra firepower means that you can have up to five shots on screen at any one time instead of the normal three. Rapid fire, on the other hand, means that your laser bolts travel at twice the normal speed.

Galaforce 2 differs from its predecessor in that when you lose a life you restart from the very beginning of that galaxy. In the original you restarted from exactly the same position in the current one, meaning that each was considerably easier to complete. But the new design does have some compensations – notably that you have a second chance to collect a valuable capsule that you may have missed the first time around.

Up and under?

Are there any rugby-playing programmers out there? This question was recently put to me by David Gareth Jones – now there's a good rugby-playing name – from Chatham, Kent. He wants to know if any programmer or software house has any plans to produce a micro version of his favourite game.

I have not heard of one in the pipeline for the BBC Micro, but why not? Almost every other sport has appeared on it in recent years. Does the challenge appeal to anyone?

John says that when you destroy the alien ship that first appears at the end of Galaxy 2 – similar to the Cozenage in Galaforce 1 – your ship takes

Turn to Page 37 ▶

Faster than light

Gary Partis is a name well known to BBC Micro games players old and new. Although this talented programmer retired from writing games a while ago – although barely into his twenties – his many offerings are still very popular.

Two games that bear the Partis stamp are Superior's Syncron and Audiogenic's Impact. The former is a shoot-'em-up which was only ever released on the Superior Collection Volume 1 compilation, while Impact is a Breakout clone which, together with Imagine's Arkanoid, gave respectability back to the old favourite.

Syncron must rate as the fastest game ever seen on the BBC Micro, so much so that I've only ever completed level A once. However, as mentioned in a previous article, Gary wrote it as a pure exercise in speed – it was not supposed to be playable. Well, it certainly met its design criterion!

A little-known secret is that Syncron only features four totally different levels. Levels E to H are the same as levels A to D, but reversed about the X-axis – flipped vertically. Similarly, levels I to L are the same as levels A to D but inverted horizontally. The last four levels – M to P – correspond to levels A to D, but mirrored in both axes.

Here are the passwords to each of the 16 levels:

A	ALPHIA	I	BETERON
B	MEGATRON	J	DELTA
C	COMMODORIA	K	SYNCLAIRIA
D	CYCLIA	L	QUADRAVOX
E	LAMBIA	M	PLATINUM
F	ATOMICA	N	ORICA
G	QUARKIA	O	SHOTOKIA
H	CHROMA	P	PARTISIA

Moving on to the second Partis game, these are the full 80 screen editor codes for Impact:

1	AEMYP	21	KWNQI	41	AKOIE	61	LSPAI
2	GWIYP	22	GKJQA	42	LAKIA	62	AELAA
3	ICEYP	23	JEFQA	43	KCGIA	63	PWHAI
4	LMAYA	24	FGBQA	44	KQCIA	64	OMDAM
5	HCNYI	25	HSOQO	45	NSPIH	65	IQMAI
6	HOJYA	26	DOKQE	46	BGLIA	66	PEIAP
7	COFYP	27	MOGQP	47	BUHIJ	67	JUEAM
8	CYBYA	28	LKCQH	48	EADIP	68	BUAAK
9	FYOYI	29	BEPQA	49	EOMAK	69	BSNAH
10	IGKYA	30	AKLQM	50	LAIAD	70	PCJAI
11	JMGYA	31	HCHQG	51	JGEAM	71	CCFAI
12	MECYP	32	PCDQH	52	FWAAF	72	CIBAI
13	BAPYA	33	BKMIP	53	PCNAP	73	LEOAE
14	JELYA	34	AEIIA	54	GUJAI	74	HCKAH
15	KCHYA	35	MIEIK	55	NCFAA	75	FCGAH
16	JYDYA	36	GAAIA	56	MSBAA	76	LYCAH
17	OEMQP	37	GANIA	57	KAOAA	77	EIPAD
18	BMIQP	38	MSJIA	58	GIKAI	78	JSLAB
19	HUEQA	39	IEFIL	59	OWGAN	79	JIHAP
20	LMAQM	40	DEBIA	60	IACAE	80	FADAK

Jet Fighter
£14.95

Sales Ledger
£64.95

Atelier
£99.95

Purchase Ledger
£64.95

Hoverbod
£14.95

System Delta &
Card Index (BBC) £64.95

Minotaur
£14.95

Home Accounts
£49.95

Orion
£14.95

System Gamma (BBC)
£49.95

Reporter
£39.95

Stock Management
£64.95

Missile Control
£14.95

Order Processing/
Invoicing £64.95

Mailshot
£39.95

Thundermonk
£14.95

SigmaSheet
£69.95

LWT Customisation
p.o.a.

GammaPlot
£69.95

Hotelier (BBC)
£69.95

Nominal Ledger
£64.95

Ancestry
£79.95

Need we say more?

Freddy's Folly
£14.95

Ibix, The Viking
£19.95

Stock Management
(BBC) £45.95

Timetabler
£688.85

System Delta Plus (V.2)
£79.95

School Administrator
£149.95

Nominal Ledger (BBC)
£55.95

Archimedes software except where indicated. All prices are inclusive of VAT.

MINERVA

69A SIDWELL STREET, EXETER, EX4 6PH. TEL. (0392)437756
FAX. (0392) 421762

◀ *From Page 35*

on its shape and firepower. Like the effects generated by hitting or collecting the various capsules, this lasts until you lose your current life. However, if you still have the shape and firepower gained by destroying a previous Cozenage lookalike, you will keep its shape but lose your increased firepower.

In fact your ship can have any one of three different appearances. Two have already been mentioned, and the third occurs when you collect the protective shield capsule that offers itself at the end of Galaxy 16. Your ship once again adopts the shape of the Cozenage lookalike but also changes colour from white with a blue border and red trim to red with a white border and blue trim. You can now destroy any of the aliens simply by ramming them. However, you can still be killed by their bombs, so you must still exercise a bit of caution.

Kevin Edwards has a couple of observations to add to John's, both of which make the gameplay considerably easier. The first, and undoubtedly most important, is that Galaforce 2 features a cheat mode activated by pressing C and Return. You will be presented with the usual galaxy jump screen, but the *furthest galaxy reached* is now set to 49. This means that you now have immediate access to the first three levels of difficulty of all 16 different galaxies.

Kevin also offers a playing tip that will help all Galaforce pilots in the battle against the large twin-sectioned aliens that appear on the last screen of most of the galaxies. For technical reasons you should shoot evenly at both sections of the alien – or all sections, if you are being attacked by two of the beasties – and not concentrate on trying to destroy them one at a time.

This is because there is a maximum number of sprites that the game will plot on the screen at any one time and it will always try to display up to that. If you destroy one of the sections of an alien that sprite will no longer be used in the current wave so the spare will be recycled as a meteorite being spat from the mouth of one of the remaining sections. Similarly, if you destroy a second section, two additional meteorites will be displayed on the screen at any one time.

Elite cheat

Compact owner Michael Humphreys of Stoke-on-Trent, Staffordshire has written to me regarding a cheat mode in the Master Compact version of Elite. I was surprised not to have heard of it before, but it definitely exists.

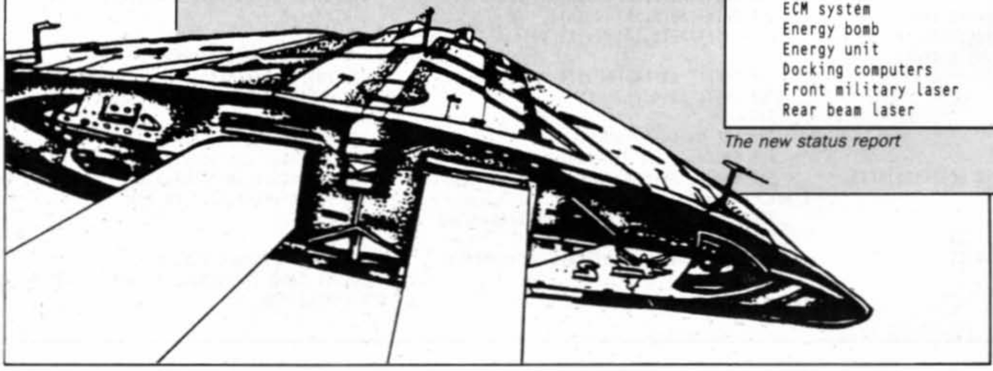
Boot the Elite disc as normal, then answer Y when you are asked whether or not you wish to load a new commander. To *Commander's Name?* answer JOE-20. The disc chugs away for a couple of seconds then clears to present you with the status report shown.

You are still in Galaxy 1 – not too far from Lave in fact – but almost everything else has changed. If you have made any real progress in the game you may already be at a point beyond that offered by this cheat facility. However, if you long ago became disheartened by constantly crashing into space stations or being blown to pieces as soon as you ventured outside the hatch, this will at least give you an idea of how the game progresses if you are prepared to persevere. Of course, you could always just cheat, but that would spoil the fun, wouldn't it?

I've tried this on every other version I've got but none contain this precreated commander file. It looks like everyone else has to get there the hard way – unless anyone else knows differently?

```
COMMANDER JOE-20
Present system      :Ensoreus
Hyperspace system   :Ensoreus
Condition           :Docked
Fuel:7.0 light years
Cash:    3964.0 Cr
Legal status: Offender
Rating: Poor
EQUIPMENT:
      Escape pod
      Fuel scoops
      ECM system
      Energy bomb
      Energy unit
      Docking computers
      Front military laser
      Rear beam laser
```

The new status report



Dealing with dates

SATURDAY
3
FRIDAY
1
SUNDAY
12
th
WEDNESDAY
6
th
TUESDAY
5
th
January
D
MONDAY
11
th

Standardise your diary routines with Graham Kendall's useful program

THE problem with dates is that they are so inconsistent in their presentation, and manipulating them in a program can lead to spaghetti-type code which will inevitably have odd bits tagged on to cater for one-off situations. Here's a set of routines to handle dates in your own programs.

The problem is not too difficult if you just need to validate a date – it's fairly easy to check on the total number of characters and use string functions to split up the individual components to ensure they're in range, although even here you need to check for leap years.

The real trouble comes when you try real date handling – storing and performing calculations with them. For example, you may have a program module that sends out invoices and perhaps there's another to send out reminders. Your prob-

```
 10 REM Date Conversion
 20 REM by Graham Kendall
 30 REM (c) The Micro User
 40 PROCinit
 50 REPEAT
 60 func%=FNmenu
 70 IF func%=1 PROCdateToInteger
 80 IF func%=2 PROCintegerToDate
 90 IF func%=3 PROCdaysDifferent
100 UNTIL func%=4
110 CLS:END
120 :
130 DEF PROCinit
140 DIM mth%(12)
150 FOR I%=1 TO 12:READ mth%(I%):NEXT
160 ENDPROC
170 :
180 DATA 31,28,31,30,31,30
190 DATA 31,31,30,31,30,31
200 :
210 DEF FNmenu:CLS
  220 PROCdb("Date Conversion",1)
  230 PRINTTAB(5,7)"1. Date to integer"
  240 PRINTTAB(5,9)"2. Integer to date"
  250 PRINTTAB(5,11)"3. Difference in da
ys"
  260 PRINTTAB(8,12)"between two dates"
  270 PRINTTAB(5,14)"4. Quit"
  280 PRINTTAB(3,17)"Please select (1-4)
 ?";
  290 REPEAT A%=INSTR("1234",GET$)
  300 UNTIL A%>0:CLS:=A%
  310 :
  320 DEF PROCdateToInteger
  330 PROCdb("Date to Integer",1)
  340 date$=FNgetValidDate("Date to conv
ert")
  350 numOfDays%=FNdateToInteger(day%,mo
nth%,year%)
  360 PROCcn("Number of days = "+STR$num
OfDays%,10)
  370 PROCspace
  380 ENDPROC
  390 :
  400 DEF FNgetValidDate(t$)
  410 REPEAT PRINTTAB(5,5)SPC240
  420 PRINTTAB(5,5)t$" (DDMMYY) ";
  430 INPUT date$:UNTIL FNdateOk(date$)
  440 =date$
  450 :
  460 DEF FNdateOk(date$)
  470 PROCdecode(date$)
  480 =FNyearOk(year%,month%,day%)
  490 :
  500 DEF PROCdecode(d$)
  510 day%=VAL(LEFT$(d$,2))
  520 month%=VAL(MID$(d$,3,2))
  530 year%=VAL(RIGHT$(d$,2))
  540 ENDPROC
  550 :
  560 DEF FNyearOk(Y%,M%,D%)
  570 IF Y%>0 IF (Y%MOD4)=0 mth%(2)=29 E
LSE mth%(2)=28
```

lem is to compare the invoice date with the current one and decide if sufficient time has passed to warrant a reminder.

If you've ever tried to work out if 10 days has passed between 25/02/88 and 03/03/88 you'll realise how messy this process can be. Not only do leap years come into it, but months have different numbers of days.

The solution is to have one date routine which you always use when manipulating dates. This has several benefits:

- Each time you write a new program you don't have to re-invent the wheel.
- By using the same routines you have a common thread running through all your programs.
- Development time can be reduced, sometimes dramatically.
- You know it works.

Before we take advantage of these benefits we need to decide on a policy that will allow us to implement our universal date system. Ideally we need a formula that let's us convert any date to an integer and back again. We can make the date calculations quickly if we're using integers and they only take up four bytes of storage space.

One method stores dates as the number of days since 1st January 1900 – which is zero – so the 2nd is day one and so on.

The invoicing problem is now simplicity. We have, presumably, stored the invoice date as an integer, so we just convert today's date, perform a subtraction, and check whether the result is greater than the limit allows.

The listing given is a program in its own right, but holds the key routines you'd need to transfer to your own. A description of the procedures and functions is given in the accompanying panel. You must make sure that the array *mth%()* is initialised at the start.

As it stands the program only accepts dates in the form DDMMYY, so it's only valid until 31st December 1999. More complex date formats and complete year definitions could be added to the decode routine if you need more flexibility.

So there it is, a complete handling for dates that's easy to use and implement.

FUNCTIONS	
dateOk	Checks that the string representation of the year is correct and splits it into its component parts.
dateToInteger	Converts the day, month and year values into a single integer.
dayOk	Checks that the day value is correct for the month given.
getValidDate	Gets a date string from the user and validates it, repeats until it's correct.
getValidDay	Gets a day value from the user and validates it, repeats until its correct.
integerToDate	Converts a day value into a date string.
menu	Displays the menu options and accepts a valid input.
monthOk	Ensures the month input is OK
numOfDaysOk	Ensures the day value is OK
pad	Converts an integer into a two digit string padding with a leading zero if necessary.
yearOk	Ensures the year is valid.

PROCEDURES	
cn	Centres and displays text on a given screen line.
dateToInteger	Routine controlling the input and conversion of a date to its equivalent integer.
daysDifferent	Routine controlling the input and comparison of two dates.
db	Centres and displays text double height on two successive screen lines.
decode	Splits the date string into three integer values: *day%*, *month%* and *year%*.
err	Displays an error message.
init	Puts days in a month values into the array *mth%()*.
integerToDate	Routine controlling the input and conversion of an integer to its equivalent date.
space	Displays a message then waits for the user to press the spacebar.

```
  580 IF Y%>-1 IF Y%<100 =FNmonthOk(M%,D
%)
  590 PROCerr("Year out of range")
  600 =FALSE
  610 :
  620 DEF FNmonthOk(M%,D%)
  630 IF M%>0 IF M%<13 =FNdayOk(D%,mth%(
M%))
  640 PROCerr("Month out of range")
  650 =FALSE
  660 :
  670 DEF FNdayOk(D%,d%)
  680 IF D%>0 IF D%<=d% =TRUE
  690 PROCerr("Day out of range")
  700 =FALSE
  710 :
  720 DEF FNdateToInteger(D%,M%,Y%)
  730 LOCAL T%,m%
  740 T%=Y%*365+Y%DIV4-1
  750 FOR m%=0 TO M%-1
  760 T%=T%+mth%(m%):NEXT
  770 =T%+D%
  780 :
  790 DEF PROCspace
  800 PROCcn("Press space to continue",2
4)
  810 REPEAT UNTIL GET=32
  820 ENDPROC
  830 :
  840 DEF PROCerr(t$):PROCcn(t$,22)
  850 PROCspace:ENDPROC
  860 :
  870 DEF PROCcn(t$,Y%)
  880 LOCAL X%:X%=19-LENt$/2
  890 PRINTTAB(X%,Y%)t$;:ENDPROC
  900 :
  910 DEF PROCdb(t$,Y%)
  920 PROCcn(CHR$141+t$+" ",Y%)
  930 PROCcn(CHR$141+t$+" ",Y%+1)
  940 ENDPROC
  950 :
  960 DEF PROCintegerToDate
  970 PROCdb("Integer to Date",1)
  980 numOfDays%=FNgetValidDay("Number o
f days")
  990 date$=FNintegerToDate(numOfDays%)
 1000 PROCcn("Date is "+date$,10)
 1010 PROCspace
 1020 ENDPROC
 1030 :
 1040 DEF FNgetValidDay(t$)
 1050 REPEAT PRINTTAB(5,5)SPC80
 1060 PRINTTAB(5,5)t$" (0..36524) ";
 1070 INPUTnumOfDays%
 1080 UNTIL FNnumOfDaysOk(numOfDays%)
 1090 =numOfDays%
 1100 :
 1110 DEF FNnumOfDaysOk(N%)
 1120 IF N%>-1 IF N%<36524 =TRUE
 1130 PROCerr("Number of days out of ran
ge")
```

Turn to Page 40 ▶

◄ From Page 49

```
 1140 =FALSE
 1150 :
 1160 DEF FNintegerToDate(N%)
 1170 LOCAL Y%,M%,D%
 1180 N%=N%+1:Y%=N%/365.25
 1190 N%=N%-Y%*365-(Y%-1)DIV4
 1200 IF Y%MOD4=0 IF Y%MOD100<>0 mth%(2)
=29 ELSE mth%(2)=28
 1210 REPEAT M%=M%+1:N%=N%-mth%(M%)
 1220 UNTIL N%<=0:D%=N%+mth%(M%)
 1230 =FNpad(D%)+FNpad(M%)+FNpad(Y%)
 1240 :
 1250 DEF FNpad(V%)=RIGHT$("0"+STR$(V%),
2)
 1260 :
 1270 DEF PROCdaysDifferent
 1280 PROCdb("Difference in days",1)
 1290 date1$=FNgetValidDate("First date"
)
 1300 numOfDays1%=FNdateToInteger(day%,m
onth%,year%)
 1310 date2$=FNgetValidDate("Second date
")
 1320 numOfDays2%=FNdateToInteger(day%,m
onth%,year%)
 1330 diff%=ABS(numOfDays2%-numOfDays1%)
 1340 PROCcn("Number of days between",9)
 1350 PROCcn(date1$+" and "+date2$+" is"
,10)
 1360 PROCdb(STR$diff%,12)
 1370 PROCspace
 1380 ENDPROC
```

Get it right!

```
  10 =    0 0    290 = F304 D    570 = 41EE 2    850 = DD1D F   1130 = 6E1A 1
  20 =    0 0    300 = 2652 A    580 = 767A 0    860 = 9719 5   1140 = F640 0
  30 =    0 0    310 = 9719 5    590 = 2EBE 4    870 = 179A C   1150 = 9719 B
  40 = DEBB B    320 = 5BF2 C    600 = F640 3    880 = 9BFE D   1160 = B9A8 1
  50 = BFBA 9    330 = 1CFB 2    610 = 9719 4    890 = DF37 8   1170 = DAB8 4
  60 =  F11 F    340 = D881 0    620 = E825 4    900 = 9719 4   1180 = AAD9 9
  70 =  C71 D    350 = 6FCA C    630 = D4AB 8    910 = B786 5   1190 =  80A 0
  80 =  636 B    360 = 6FC1 6    640 = 3D72 8    920 = 91A9 7   1200 = C61A C
  90 = 8C04 A    370 = 65FC 8    650 = F640 5    930 = E296 0   1210 = 1011 0
 100 = 59C2 F    380 = ED0F 1    660 = 9719 F    940 = ED0F 6   1220 = B8D7 7
 110 = 8215 F    390 = 9719 B    670 =  571 C    950 = 9719 C   1230 = 1CE4 B
 120 = 9719 0    400 = 9422 9    680 = 5A30 0    960 = B9F8 C   1240 = 9719 0
 130 = 40D7 3    410 =  A22 C    690 = 7C18 4    970 = 2329 3   1250 = FB7F 9
 140 = EDD6 4    420 = 1397 4    700 = F640 0    980 = F064 B   1260 = 9719 D
 150 = 17EC D    430 = 1FF9 4    710 = 9719 6    990 = B4EC F   1270 = 9BEE 3
 160 = ED0F 9    440 = 4A82 6    720 = 68C2 B   1000 =  227 C   1280 = BA43 E
 170 = 9719 E    450 = 9719 F    730 = 338C B   1010 = 65FC 8   1290 = 3221 D
 180 = C751 0    460 = 9991 9    740 = 15F7 B   1020 = ED0F 9   1300 = 6989 D
 190 = 43B8 0    470 = A449 6    750 = 4DEA 5   1030 = 9719 9   1310 = AAB3 9
 200 = 9719 D    480 = 30D7 7    760 = CDBD 0   1040 = CF65 E   1320 = 124A 9
 210 = E1EF 1    490 = 9719 D    770 = B508 F   1050 = FB69 5   1330 = 240E 2
 220 = A9EF 2    500 = B2F3 4    780 = 9719 5   1060 = 49BC F   1340 = 71BD 4
 230 = 78E2 C    510 = BD9C F    790 = 6B8B 9   1070 = ED03 E   1350 = 9286 C
 240 = CC38 2    520 = B44B F    800 = 5F86 4   1080 =  B6A D   1360 = 3E3A E
 250 = C42E 8    530 = C807 2    810 = 2B9E B   1090 = FC4F 8   1370 = 65FC 6
 260 = 4844 A    540 = ED0F 4    820 = ED0F 8   1100 = 9719 7   1380 = ED0F 0
 270 = A440 5    550 = 9719 5    830 = 9719 C   1110 = 6B11 D
 280 = AC8E D    560 = 59EB E    840 = F652 B   1120 = 5BE5 D
```

COST EFFECTIVE CAD

TECHSOFT

DESIGNER intro

POSSIBLY THE ONLY DRAUGHTING SYSTEM YOU WILL EVER NEED

Created specifically for the Archimedes, **DESIGNER INTRO** is based on its big brother **DESIGNER (ARCHIMEDES).** It shares the same uniquely logical menu structure and many of the powerful draughting routines. Enough power in fact to cope with all of most peoples draughting requirements. Many of **INTRO's** features are shown below. There is one feature however that we cannot show - its most important one - the simplicity of use that guarantees a short learning curve and speedy drawing generation.

FEATURES

Fully menu driven with simple prompts and instructions for all routines.

User definable grid with grid lock.

Hunt and lock onto nearest end of line, arc or centre of a arc/circle with a single button press.

True arcs, tangents and normals, essentials for most drawing applications but particularly important for engineering applications. Nine in-built arc types alone.

Ellipses, full or part.

Powerful delete facilities, e.g., last item, line, part line, arc, part arc, etc. (The software automatically finds intersections.)

Unique MODIFY command allows drawing to be redrawn a line at a time forwards or backwards. The drawing may be 'entered' at any point thus giving total flexibility to edit and alter drawings.

Automatic or manual dimensioning, user definable arrow heads/leader lines.

Text entry at any size, angle or slope. (Text output limited only by the plotter available.)

Hatching at any angle/spacing. Automatically finds enclosed boundary plus single or multiple islands.

Powerful ELEMENT (layer) structure.

No practical limit to the number of drawing elements that may be created.

Comprehensive transformation commands, MOVE, ROTATE, MIRROR IMAGE, ALTER SIZE.

No practical limit to the size of drawing created - limited only by disk space.

Libraries of drawings can easily be created. Library items can then be incorporated into the current drawing at any size, angle, position.

Zoom, scale and pan facilities (plot-outs may be taken at any time).

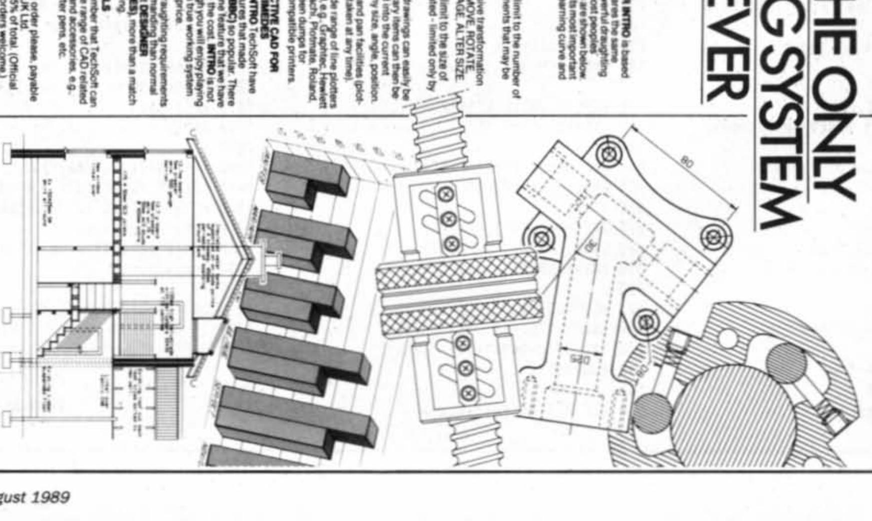
Output to wide range of line plotters from A5 to A0, e.g., Graphtec, Hewlett Packard, Hitachi, Plotmate, Roland, etc. Plus screen dumps for FX/MX/RX compatible printers.

COST EFFECTIVE CAD FOR YOUR ARCHIMEDES
In creating **INTRO** TechSoft have kept the features that made **DESIGNER (BBC)** so popular. There is however one feature that we have cut back on - the cost. **INTRO** is not a toy (although you will enjoy playing with it), it is a true working system at a realistic price.

P.S. If your draughting requirements are more demanding than normal take a look at **DESIGNER (ARCHIMEDES)**, more than a match for any drawing.

PERIPHERALS
Please remember that TechSoft can supply a wide range of CAD related peripherals and accessories, e.g., plotters, plotter pens, etc.

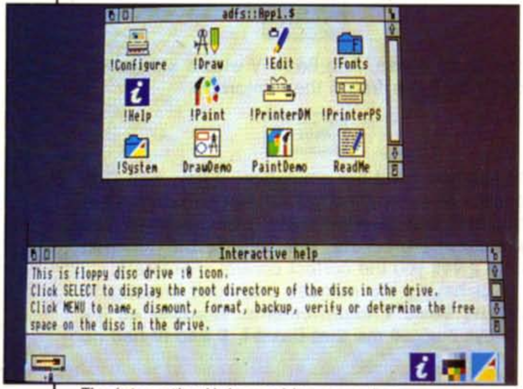
ORDERING
Cheque with order please, payable to TechSoft UK Ltd.
Add VAT @ 15% of total. (Official educational orders welcome.)



ONLY £75 + VAT.

TECHSOFT
NEW IDEAS IN SOFTWARE

TechSoft UK Ltd.
Old School Lane
Erryrys, MOLD
Clwyd CH7 4DA
Tel: 082 43 318



This is floppy disc drive :0 icon.
Click SELECT to display the root directory of the disc in the drive.
Click MENU to name, dismount, format, backup, verify or determine the free space on the disc in the drive.

The interactive Help provides a running commentary on the system

HERE we present two views of the A3000 from very different angles. Mike Redbridge, an experienced BBC Micro user looks at the features that strike a newcomer to a Risc machine. And Mike Cook picks up his screwdriver and gives an expert view of the micro's construction.

The A3000 is almost identical, from the software viewpoint, to the existing Archimedes, the applications provided being slightly more advanced versions of those supplied with the original Risc OS upgrade kit.

In fact the only software difference we've been able to find is that there is no automatic detection of disc insertion when requested by the ADFS Filer, so you need to click the Okay button when you've loaded it.

To find out all about the capabilities of the Risc OS software read the series of articles in *The Micro User* from January to May 1989.

Acorn's bouncing baby

Mike Redbridge checks out the wally factor

THE editor collared me as I paid my monthly visit to *The Micro User* offices. "Would you like to review the new BBC Micro?" His henchman added helpfully: "He means the new Archimedes 3000. It's that one over there, pretending to be an Amiga".

"We want the initial impressions of an old BBC Micro freak", continued the editor, who knew full well that I was still on Basic I with DFS 0.9 and a bit. "We need to check out the wally factor – so you get the machine and no manuals. Should be just like most of your roms".

What James Herriot is to cows, I am to Acorn products. So as soon as I got it home I had a quick glance at the backside. Gone are the user port, UHF output, RS232, Tube, drive connector and analog port.

In fact the only things that have survived unchanged are the printer port and the mono video. The RGB socket is now a nine pin D connector, as is the serial port – not fitted, like Econet. There is, however, a rather large expansion port which holds the promise of goodies to come. And you do get a mouse with three buttons.

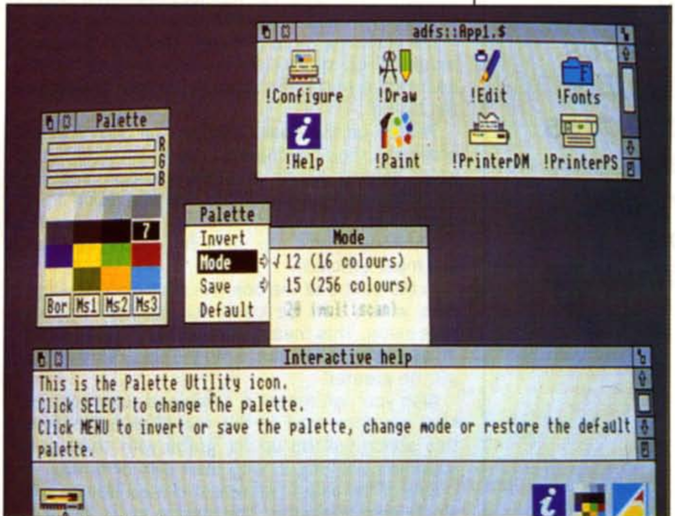
The micro resembles an ST/Amiga complete with 3.5in disc drive in the right-hand side. It still has a BBC Micro flavour, though, thanks to its top row of red function keys – you get 12 this time. With its separate numeric pad and Page Up/Down keys, the keyboard seems to be styled on the IBM PC.

Unfortunately it resembles the US PC, so double quotes is Shift+' – where the old square brackets key was, Shift+2 gives you the @ sign instead of quotes, colon becomes Shift+; and so on. Actually when you've learned your way around it, the layout is very good.

The monitor is the standard Archimedes type, but attaching it to the micro revealed one of those annoying little quirks that Acorn seems to use as a trademark – the monitor lead is far too short. If you're the kind who likes to use a monitor stand you'll get away with it. Try to position the monitor behind the micro though, and you've only got a couple of millimetres of slack to play with.

Having overcome the troublesome umbilical, I was ready for switch-on. Gone is the extrovert

Turn to Page 42 ▶



This is the Palette Utility icon.
Click SELECT to change the palette.
Click MENU to invert or save the palette, change mode or restore the default palette.

Using the Palette window and menus

◀ From Page 41

rocker switch at the back – you use a discreet little switch on the left. Gone too is the raucous BBC Micro signature tune, replaced by a rather plaintive bleep.

If you found the BBC B's initial screen inspiring you'll like this one – known as the Desktop. About 90 per cent of it is grey. The other 10 per cent consists of a light grey strip called the icon bar across the bottom with three pictures or icons on it. There's also a nice blue pointer.

Obviously the pointer was controlled by the mouse, but first of all I tried the keyboard to see if anything worked. Little did, though I found that Control+Break has the effect of rebooting the system. Then I stumbled upon f12, which scrolled the screen up to leave a line at the bottom beginning with a star. It was obviously a command line so quick as a flash I entered the command:

```
*BASIC
```

and there it was, Arm Basic V with a staggering 651,516 bytes free. I then entered:

```
MODE 7
```

to see how good the emulation, if any, was. The answer was very good indeed: Not only do you get the half and quarter signs symbols when you press curly brackets, but shifting the function keys gives you the correct control characters.

Not having the manual, I couldn't investigate all the Basic V improvements. However as it's always bugged me that Basic I, II and IV had no

Costs are cut, but

An inside view from our resident expert Mike Cook

WHENEVER I get a new micro I like to take the lid off before plugging it in. So when I got my hands on this new system that's what I started to do – but I experienced more difficulty removing the case than I had imagined I would. It is held on by two screws at the back – simple enough – but three moulded clips hold the front and back together. You have to hold the lid and base in tension and insert a large-bladed screwdriver into each of the clip slots and twist – a manoeuvre that risks damaging the plastic if you are not careful.

Once opened, the first surprise was that the power supply was not housed in a metal box. However a note attached to the cover indicated that this would probably not be the case with the full production models.

The printed circuit board was rather sparsely populated, with most chips being soldered directly in – that is, no sockets. This eases construction and increases reliability but it does make servicing more difficult. The disc drive was mounted on pillars above one section of the board so it had to be removed before the rest of the board.

Printed on the board are the four points of the compass, thus making sure there is no confusion when talking about a chip's position and link orientation. I was pleased to see that much use is made of surface-mounting chip ceramic capacitors. These are used for decoupling, and are most efficient.

In the centre of the board is a long row of single pins which can be used for internal memory expansion. This means that you will have to plug in an extra board, not simply chips, so the cost will be greater.

Also you can mount a combined user port and Midi interface card on this row of pins. No doubt this space will be up for grabs with third party suppliers pitching in with their own offerings.

One of the chips that was socketed was an Intel single chip computer. This device looks like a 40 pin eprom but contains eprom, ram, processor and input/output ports. In fact it is a complete micro processor system with the job of handling the keyboard which, like on the rest of the Archimedes range, is a serial device feeding into the Risc I/O controller chip. On production machines this chip is likely to be replaced by one without an erase window as they are cheaper for mass production.

The keyboard uses a membrane, but you would hardly know. It is not like those awful Sinclair machines, but has proper keys. However the feel is not quite the same as a normal keyboard and there is a noticeable click as you press the keys down – a clever trick of the moulding process. In use the keyboard just felt different, not worse, but it does mean that if anything goes wrong with a single key most likely the whole board will have to be replaced.

The internal speakers were smaller than on the others in the Archimedes range, being just about 1in in diameter.

If you want to add expansion cards you will need an external expansion box. Pres is currently producing one as an expandable unit. Moreover, unlike the other Archimedes, only a single +5 volts power supply is available, so it is likely that some expansion cards on the market at the moment will have to be modified to accept an external power supply before they will run on the A3000.

Looking at the inside of the A3000 it is easy to see why Acorn has produced the machine – it is much cheaper to make than the original A300 or A400 series. Acorn has passed on some, but not all, of those savings to users in the price. It has also economised slightly by not fitting the little used serial port chips. However the performance has not been compromised, and to the software user it behaves just like its cousins.

A hard disc or second floppy drive will have to be fitted externally to the A3000 with the accompanying sprawly mess much beloved of the BBC B. Perhaps the biggest disadvantage is that it is not possible to stand the monitor on the machine.

However, Pres has developed a stand which will cater for this and is upgradeable to cope with a hard drive and second floppies.

> *‘Most chips were soldered in. This eases construction and increases reliability but it does make servicing more difficult’*

WHILE statement, I tried a WHILE loop out. Initially WEND was dismissed as a mistake, but on changing it to ENDWHILE – remembering ENDPROC – the loop worked fine.

Everything I threw at Basic and the standard OS/ADFS worked. I even managed to use *OPT 4 3 with a !BOOT file to boot up a program on Shift+Break. I've sinced learned that Basic V supports a CASE statement, array parameters for procedures and return values – and virtually everything on my Basic wish list.

And the speed! Acorn claims it's the fastest interpreted Basic in the world, and I believe it. So within five minutes of setting up the micro I was running routines in Basic with no problem. Even the *FX commands are preserved in this incarnation, so in effect I had a super BBC B.

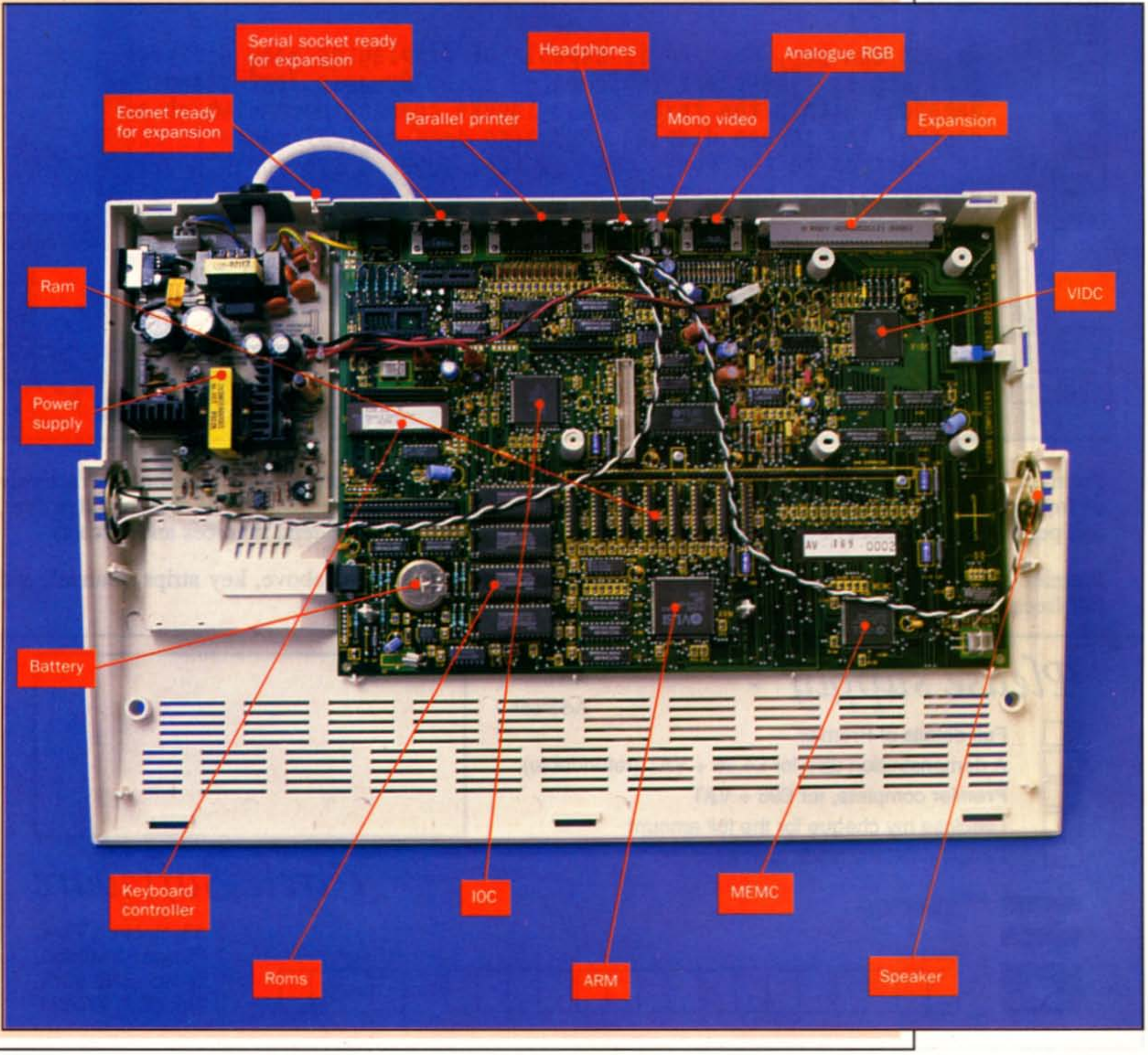
However this was just scratching the surface of the machine's potential. I returned to the Desktop with the obvious *DeskTop, though I've since learned that pressing Return on an empty command line has the same effect.

Now I've worked with wimpish software before so I had a fair idea of how to use the icons. I started with the one on the left – a disc drive. With applications disc one in the drive I moved my pointer over the drive icon and clicked. A window opened with a colourful display showing the names and corresponding icons of the files on the disc. Here I had a bit of luck – one of the files was !HELP with an *i for information* symbol.

Moving the pointer and clicking on this didn't do much good. However I'd used double clicks on other systems so I tried it: The disc whirred and a

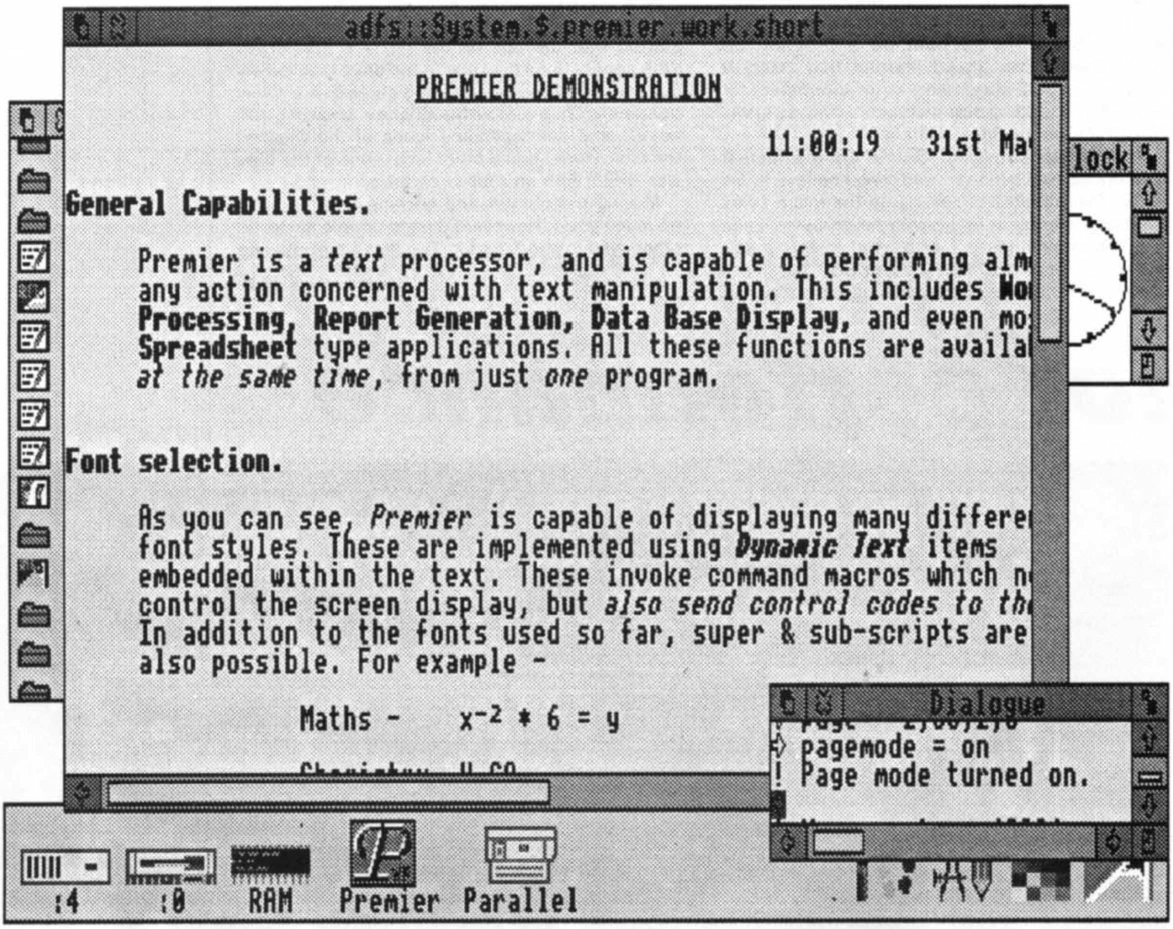
Turn to Page 45 ▶

not performance


Serial socket ready for expansion
Headphones
Analogue RGB
Econet ready for expansion
Parallel printer
Mono video
Expansion
Ram
VIDC
Power supply
Battery
Keyboard controller
IOC
MEMC
Roms
ARM
Speaker

Premier

The Archimedes Text Processor



adfs::System.$.premier.work.short

PREMIER DEMONSTRATION

11:00:19 31st Ma

General Capabilities.

Premier is a *text* processor, and is capable of performing alm
any action concerned with text manipulation. This includes **Wo**
Processing, Report Generation, Data Base Display, and even mo
Spreadsheet type applications. All these functions are availa
at the same time, from just *one* program.

Font selection.

As you can see, *Premier* is capable of displaying many differe
font styles. These are implemented using ***Dynamic Text*** items
embedded within the text. These invoke command macros which n
control the screen display, but *also send control codes to th*
In addition to the fonts used so far, super & sub-scripts are
also possible. For example -

Maths - $x^{-2} * 6 = y$

Dialogue

pagemode = on
! Page mode turned on.

Premier, is a command driven text processor, capable of almost any text processing function, interactively or from compiled command files. A unique Dynamic Text feature simplifies control of screen and printer, and permits spread sheet like items to be included in reports, customised letters, invoices and forcasts.

Premier comes complete with the word processor application illustrated above, key strips, manual, and full free maintenance during 1989.

Please supply -

Name:-
Address:-

☐ Full details of Premier
☐ A demonstration disc for £4.35 + VAT (refundable)
☐ Premier complete, for £96 + VAT
☐ I enclose my cheque for the full amount
☐ Please debit my credit card account

SIGNED:-

CARD NO:

EXP. DATE:

Circle Software

33, Restrop View,
Purton, Swindon,
Wilts. SN5 9DG
Tel: 0793 770021

◀ **From Page 43**

window labelled *Interactive Help* appeared at the bottom of the screen. Also the information icon appeared on the right of the icon bar. To use a bit of jargon, the !HELP application was now installed.

Although the Help window was blank at first, moving the pointer over the title and side bars/icons of windows caused explanatory messages to appear. For instance when the pointer was actually inside the Help window I was told:

```
This window displays help messages
from helpful applications.
```

This facility was really useful. As I worked through the other applications the Help window showed me how to move windows, alter their size, overlap them, close them, move one to the foreground and so on. Even if you've never used windows before, you'll master them in minutes this way.

These messages also helped me to discover that the three mouse buttons are, from left to right, Select, Menu and Adjust. I tried out Adjust on the drive icon; it catalogued the disc again. As I was to find later, Adjust tends to mimic Select, but with one or two refinements. For instance using Adjust to move a window rather than Select preserves the order of the windows, while Select brings that window to the top.

Clicking Menu on the drive icon gave me just that, a menu of options allowing me to format, name, verify and so on. Menu items with submenus have arrows after them. Moving the pointer to these displayed the various suboptions. Sometimes this submenu offered a dialog box – that is, it needed typed input, as in naming a disc.

One of the icons to the right of the icon bar is a grid of colours. Clicking on this produced a palette which allowed me to mix my own versions of the logical colours by using slider bars to control the amount of red, green and blue in the selected colour.

Clicking Menu on the palette icon also let me save and invert palettes as well as – thankfully – returning me to the default settings when I'd gone hopelessly astray.

Next to be investigated was the rightmost icon, the Archimedes symbol, which proved to be the Task Manager. Using Menu here let me pick a new task, use star commands and *display task* – though I'd no idea what the last option meant. So naturally I chose it.

I got a screen showing memory usage in three categories:

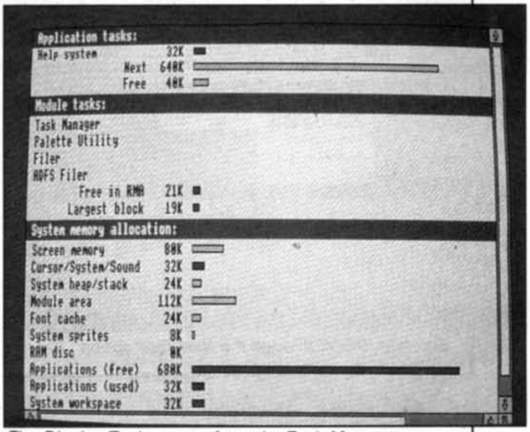
- Application tasks – as the Help system was mentioned here, I took these to be tasks I'd installed.
- Module tasks – containing the ADFS, palette utility and the Task Manager itself. I took these to be operating system tasks.
- System memory allocation – a map of the whole 1,024k of memory.

The various memory allocations are shown by red and green bars, the green showing free memory, the red memory used. The red bars act as slides – you can click on them to change their values. Increase the red and you'll see the green, free memory, decrease accordingly.

I noticed that there was a provision for a ram disc, though it was initially set to zero. I gave myself 256k of ram file by clicking. As the red bar grew a neat-looking chip appeared beside the disc icon, proving that the icons on the left of the bar represent filing systems.

Copying files to the ram disc is easy. A click on the ram icon gives you its catalogue, initially empty. Clicking on the disc icon gives its catalogue in turn.

Next you click the file you want to copy and, holding down Select, drag a ghost rectangle over to the ram catalogue. Releasing Select then transfers the file to the ram disc, which is confirmed by its icon appearing in the ram disc window.



```
Application tasks:
Help system          32K
              Next  640K
              Free   40K
Module tasks:
Task Manager
Palette Utility
Filer
ADFS Filer
       Free in RMA   21K
     Largest block   19K
System memory allocation:
Screen memory        80K
Cursor/System/Sound  32K
System heap/stack    24K
Module area         112K
Font cache           24K
System sprites        8K
RAM disc              0K
Applications (free) 680K
Applications (used)  32K
System workspace     32K
```

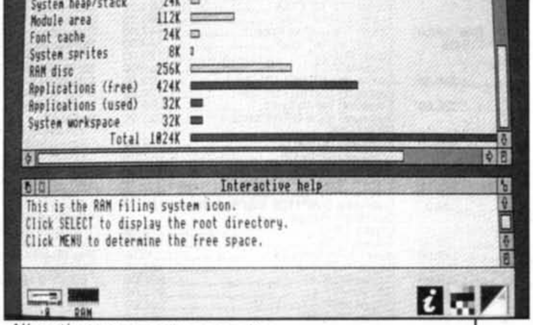
The Display Task screen from the Task Manager

When I tried to delete files I found that the menu button can give two different menus for the same application. If you click menu on an icon on the bar you get a high level menu, allowing you, say, to quit an application. Using menu when the pointer is in the application's window gives another menu of options of more relevance to the work in hand.

Clicking menu on an icon in a filing system window eventually leads you to a delete option. Of course, f12 and *DELETE will do as well.

I used the high level menu of the Task Manager

Turn to Page 46 ▶



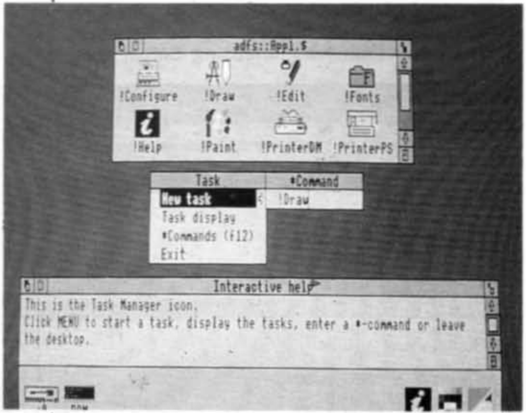
```
Tasks
System memory allocation:
Screen memory        80K
Cursor/System/Sound  32K
System heap/stack    24K
Module area         112K
Font cache           24K
System sprites        8K
RAM disc            256K
Applications (free) 424K
Applications (used)  32K
System workspace     32K
             Total 1024K

Interactive help
This is the RAM filing system icon.
Click SELECT to display the root directory.
Click MENU to determine the free space.
```

Allocating memory to a ram disc

◄ *From Page 45*

to enter my first application. I clicked Menu on the Archimedes icon and chose the New Task option, entering !Draw. The Draw icon then appeared on the bar. One click on the icon and a blank window appeared.

I won't go into Draw here save to say that it's a rubberbanding, shape-filling type of program. It's extremely intuitive – the menu structure is very clear – and if you do manage to have difficulty the Help window prompts you. My Archimedes symbol might not win any prizes, but considering it was drawn within five minutes of using the package for the first time it's not so bad.



This is the Task Manager icon.
Click MENU to start a task, display the tasks, enter a *-command or leave the desktop.

Entering !DRAW through the New Task option

Incidentally, throughout my explorations I found the Archimedes warning prompts very thorough. It simply refused to let me forget to save something. Loading files into the tasks was simple, too: You just drag the relevant icon from a directory window into the application's window.

As a finale I installed Edit by double clicking on its icon to transfer it to the icon bar, then clicking on that icon to open a window. I had a memory space problem at first, but quitting Draw gave me the room I needed. I also reduced my ram disc size while I was at it. It shows how user-friendly the Archimedes is when you consider I was working at this level of complexity within an hour of switching on for the first time.

Edit itself is a worthy text editor and very simple to use. It's not going to set the world on fire but it works and it's free.

As I only had application disc one, and only a couple of hours to spare, I had to cease my explorations there. I doubt I covered even one hundredth of the options available to me. However I'd seen enough to be convinced that this new BBC Micro is a superb product. Incredibly sophisticated but utterly simple to use, it's a brilliant successor to the old BBC B. Well done Acorn.

RING NOW ON:
TEL: 0753 35557
FAX: 0753 511122

dataplex
10 Petersfield Avenue, Slough, Berkshire SL2 5DN
Tel: 0753 35557 Fax: 0753 511122

Conditions of Sale
- All prices exclude VAT and delivery charges
- E&OE all prices subject to change without notice
- All collections made by prior arrangement from our warehouse
- Please add £1+VAT for consumables and £8+VAT for all other items for next day delivery

ARCHIMEDES Now supplied with the new RiscOS

	Basic	Mono	Colour
A305	705.00	765.00	904.00
A310	839.00	879.00	1078.00
A310M	939.00	999.00	1138.00
A410	1179.00	1239.00	1378.00
A420	1679.00	1739.00	1878.00
A440	2509.00	2569.00	2708.00

0.5Mb Ram for 305	139.00
Podule Backplane	39.00
Rom Podule	40.00
Rom Podule +Bat. Backup	59.00
Archimedes Ref. Manual	29.00
2nd Drive for 305/310	118.00
Backplane for 4 Podules	39.00
Backplane for 2 Podules	29.00
I/E Podule	85.00
20Mb Disk & Controller	469.00
IEEE Interface	280.00
PC Emulation Pack	79.00
New 3000 System	589.00
BBC MASTER 128 PACKAGE	
BBC Master 128	372.00
Save over £30.00	
BBC Master 128 +5.25" 400k Drive 40/80T +Philips CM8833 Colour 14" Med. Res.	599.0
ACORN MASTER COMPACT SYSTEMS Inc. 3.5" Drives	
Package 1 Standard System	305.00
Package 2 Computer + TV Modulator	325.00
Package 3 Computer + 12" MI Res. Philips Green Screen	356.00
Package 4 Computer + 14" Med Res. Philips Colour Screen	469.00
RS232 Kit for Compact	25.00
Additional 3.5" Drive	89.00
DATAPLEX DRIVES BBC	
Drives without PSU	
5.25" Single 400K Drive	75.00
5.25" Dual 800K Drive	149.00
3.5" Single 400K Drive	65.00
3.5" Dual 800K Drive	119.00
Combo Drive	149.00
Drives including PSU	
5.25" Single 400K	89.00
5.25" Dual 800K Drive	169.00
3.5" Single 400K Drive	79.00
3.5" Dual 800K Drive	169.00
Combo Drive	169.00
All 5.25" Drives are 40/80 Switchable	
DATAPLEX HARD DISK DRIVES	
20Mb Hard Drive for BBC	379.00
30Mb Hard Drive	399.00
40Mb Hard Drive	429.00
60Mb Hard Drive	479.00
MONITORS	
NEC Multisync GS	139.00
NEC Multisync II	380.00
NEC Multisync Plus	612.00
NEC Multisync 20"XL	1359.00
Package Bell 14" M/Sync	299.00
Philips BM7502 12" Mono	65.00
Philips 7513 12" Mono	71.00
Philips 7723 14" Amber	89.00
Philips 8833 14" CGA	189.00
Philips 9053 14" EGA	334.00
Philips 9073 14" EGA	394.00
Philips 8873 M/Sync 14"	449.00
Taxan KX123 12" Mono	94.00
Taxan 620 12" CGA	264.00
Taxan 760 14" EGA	395.00
Taxan 770+14" M/Sync	447.00
Taxan 780 14" VGA	389.00
Taxan 980 20"	1779.00
Taxan 990 20"	1865.00
Samsung MD1257 12" Mono	89.00
Samsung CD1469 14" Col	229.00
Samsung 14" M/Sync	399.00
Samsung EGA CGA CM4531	325.00
PRINTERS	
Amstrad LQ3500 DI	244.00
Amstrad DMP4000	227.00
Amstrad LQ5000 DI	329.00
Brother HR20 Daisywheel	318.00
Brother HR40 Daisywheel	688.00
Quendata DWP1120 160PS D'wheel	169.00
Dot Matrix Range	
Citizen 120D	110.00
Citizen 180E	127.00
New 24 Pin Swify 24	POA
Citizen MSP 15E	188.00
Citizen MSP 40	228.00
Citizen MSP 45	252.00
Citizen MSP 50	292.00
Citizen MSP 55	322.00
Citizen Premier 35	364.00
Citizen HQP 40	295.00
Citizen HQP 45	295.00
All Citizen printers come with 2 year warranty	
Epson LX800	153.00
Epson FX850	283.00
Epson FX1050	377.00
Epson EX800	425.00
Epson EX1000	581.00
Epson LQ500	249.00
Epson LQ850	404.00
Epson LQ1050	542.00
Star LC10 Mono	155.00
Star LC10 Colour	195.00
Star LC24-10	252.00
NEC P2200 Pinwriter	265.00
Cut Sheet Feeder	52.00
Serial Interface Kit	63.00
Font Cartridge	35.00
NEC P565XL	514.99
NEC P6+80 Character	414.00
NEC P7+136 Character	534.00
Colour Upgrade Kit	80.00
Panasonic KXP1018	128.00
Panasonic KXP1124	249.00
Panasonic KXP1180	165.00
Panasonic KXP1592	253.00
Panasonic KXP1595	344.00
Panasonic KXP1540	428.00
NEW MANNESMANN TALLY LAUNCH OFFER	
MT81 (Dot Matrix)	115.00
Sheetfeeder	62.00
Serial I/F	62.00

- Incredible Price/Performance Ratio
- Amazing 8K Buffer
- 130CPS Draft, 26CPS NLQ
- Push Tractor Feed
- Epson FX85 and IBM Proprinter Compatible
- Flexible Paper Handling
- Paper Parking for Cut Sheet Feed
- Optional Sheetfeeder
- Optional Serial Interface

NEW COLOUR PRINTER FROM OLIVETTI
The Visible Benefits (Dot Matrix)

DM105S	189.00

- 200CPS High Speed Draft (AT 10CPI)

150CPS Draft
- 30CPS NLQ
- Friction & Tractor Feed
- 5.5K Buffer
- Standard 4 Colour Ribbon

* Optional Sheet Feeder	89.00
* Optional Roll Holder	15.00

- Free Printer lead with Olivetti–please quote "Micro User"

NEW MANNESMANN TALLY BUBBLE JET

THE MT90 at only	375.00
Longlife 24 Nozzle Print Head, Tractor, Paper Roll + Cut Sheet, Paper Handling	
Optional Sheetfeeder	99.00
RIBBONS	
KXP 1081/1090/172	4.00
DMP 2000/3000/3160	2.80
DMP 4000	4.40
PCW 8256/LQ 3500	4.50
Panasonic 3131/MP26	4.40
LX 800/RX/MX/FX80	3.15
FX1000/FX/RX100	4.40
NL10	4.40
LQ500/800/850	4.40
LC10	4.40
NEC	5.00
LASER PRINTERS	
Brother HL8	1395.00
Brother HL8 OS Postscript	3569.00
Epson GQ-3500	1099.00
Hewlett Pack Laser II	1338.00
Hewlett Pack laser IID	1979.75
Panasonic KXP 4450	1349.40
Qume Script Ten Postscript	2969.00
Star LP8	1249.00

All laser printers include 1 year on site maintenance

FAX

Canonfax	
Fax80	623.00
Fax230	915.00
Fax410	1415.00
Nefax N2	899.00
Nefax N3	1006.00
Panfax UF150	915.00
Panfax UF250	1265.00
Sanyofax 100	989.00
Sharp FO-80	849.00
Sharp FO-150	959.00
Sharp FO-210	1269.00

REPAIRS – Fast reliable and professional repairs centre.

ANOTHER BRANCH OPENING SHORTLY – Education, Government & PLC orders welcome

Taking a BROADER view

Ken Down wields his Wimps to re-size windows

AS we are approaching the end of this series, this month I propose to add the list and edit functions to our accounting program. We only need to learn one new Wimp call – one that re-sizes a window. First we need a new line in the menu selection routine and to call PROClist with the selection number from the second menu:

```
1660 WHEN4:PROClist(poll%!4)
11600 DEFPROClist(ac%):IFac%=-1PROCcreatealer
t("Invalid Selection"):ENDPROC
11610 ar%=ac%:RESTORE20400:dialog%=FNcreatedi
alog(7):ENDPROC
```

As you will be expecting by now, PROClist doesn't do very much. It simply sets up a dialogue box with the data stored in line 20400 onwards:

```
20400 DATAlist,3,532,900
20410 DATA290,400,498,480,7,0,&303D,Cancel
20420 DATA40,24,250,880,7,0,&303D,"FNnewacc(ac
%,&3039)"
20430 DATA290,800,498,860,1,7,&303D,a$(ac%)
```

This is virtually identical to the data list for the account dialogue box, lines 20000 to 20050. As with that one, you can pick one account from within the area you selected from the submenu. However, the variable *claim$* is different this time, so when you click on this box a different function is called.

First check that a valid icon has been selected. If not – perhaps someone clicked at random in the dialogue box – we return a value of FALSE and end the function, leaving the box on the screen. Much the same thing happens if we select icon one, Cancel, except that this time we close the window and return the mouse to its previous limits.

If a valid selection was made we invert the icon and set a couple of variables – *tl%* is also a counter but stands for total and keeps track of how many matching entries have been found. The WHILE ... ENDWHILE loop goes through the list of account names, placing in a list the numbers of those which are in this area.

Line 11750 uses it to select the name of the account selected. This is a rather cumbersome way of doing things but unfortunately there is no easy way of reading the text contents of an icon.

The next line performs somewhat the same function except that this time it is finding out the total number of entries in the chosen account. We need to know this in order to make a window of the correct size. Once that has been worked out we create and open the window.

The final step is to place certain values in the array *window%()*. The first element contains the

area number, the second the account number and the third holds the vertical size of the window. All this information is used by PROCredowindow:

```
11700 DEFFNclickdialoglist(icon%):IFicon%<0 =F
ALSE
11710 IFicon%=0PROCinverticon(dialog%,icon%):P
ROCclosewindow(dialog%):PROCmouselimit(0,0,127
9,1023):claim$="":=FALSE
11720 PROCinverticon(dialog%,icon%):tl%=0:i%=0
11730 WHILEi%<=N%:IFASC(LEFT$(ac$(i%),1))=ar%t
l%?list%=i%:tl%+=1
11740 i%+=1:ENDWHILE
11750 nme%=icon%-2:name$=MID$(ac$(nme%?list%),
2):tl%=0
11760 FORi%=0TOL%-1:PROCsplit(i%):IFar%=ac%IFn
me%=nm%tl%+=1
11770 NEXT
11780 j%=FNcreatewindow(name$,&F,0,7,1224,tl%*
32,0,0,1280,1024,0):PROCopenwindow(j%,block%)
11790 w%=FNwhich(j%):window%(w%,0)=ar%:window%
(w%,1)=nme%:window%(w%,2)=tl%*32-4
11800 =TRUE
```

Once these procedures and functions have been entered you can list all your accounts one by one on the screen. Each is in a separate window which can be moved around, enlarged or reduced and put on top of or behind other windows – it's fascinating.

If you have 32 windows on screen and try to open another one you get an error message. This limit has been upped to 48 on Risc OS. Actually

Turn to Page 48 ▶

◄ From Page 48

10 or 12 windows are all that I can fit easily on the screen without most of them being invisible – and there's little point in that.

Apart from ease of use, the advantage of the Wimp system is that you can have two or more accounts onscreen to compare them. Once this has been done you might as well close the windows and get back to using the program.

Sooner or later you are going to make a mistake. You will put the wrong figures in an account or wish to alter the date or even make a different account the corresponding account. If you spot the mistake while making the entry in the first place the best thing to do is to click Cancel and start over again.

However, the edit option is there if you only find the mistake later. You need:

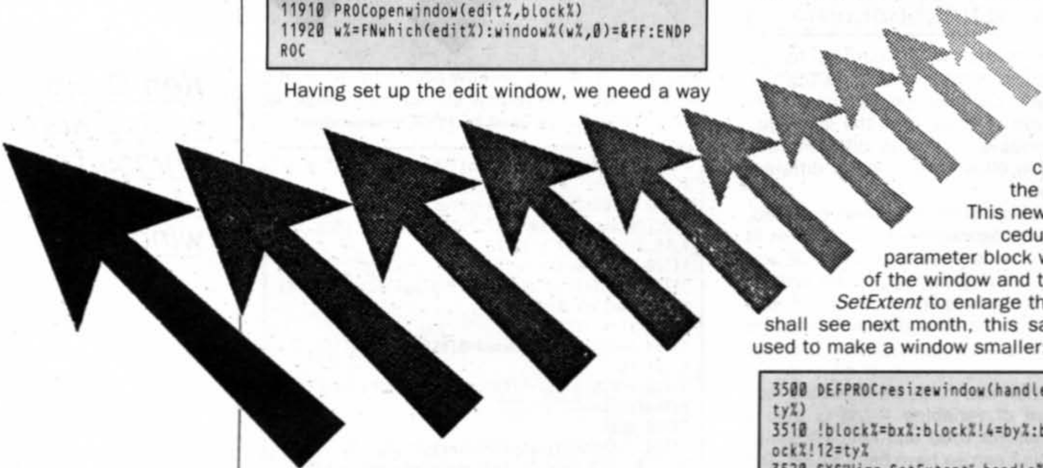
```
1640WHEN2:PROCedit
```

PROCedit sets up a window very similar to the balance sheet one which, you might think, you type into directly. Unfortunately, you cannot, as it presents far too many technical difficulties for such a simple program.

There is also a practical reason. The balance sheet does not display the area and account numbers, so it would be impossible for you to change them. Instead we use the edit window as a way of selecting an account and then work on it with the same dialogue box used for the initial entry:

```
11900 DEFPROCedit:edit%=FNcreatewindow("Edit",
&F,0,7,1224,L%*32,0,0,1280,1024,0)
11910 PROCopenwindow(edit%,block%)
11920 w%=FNwhich(edit%):window%(w%,0)=&FF:ENDP
ROC
```

Having set up the edit window, we need a way of dealing with clicks within it:



```
2690 IFbutton%=4IFhandle%=edit%PROCclickedit
```

PROCclickedit first works out which record has been clicked by using the vertical position of the mouse pointer – held in poll%!4 – and subtracting the scroll bar position given by PROCtwaorigin. The final statement on that first line makes sure that the selected entry is the initial one, not the corresponding entry.

We then close the edit window and set default values for the dialogue box as well as put details of the entry in the memory areas to be read by FNcreatedialog. As a guide to users, the final line sets the Credit or Debit icons to the correct colour and surrounds the initial area with a yellow box:

```
12000 DEFPROCclickedit:PROCtwaorigin(block%,x%
,y%)
12010 ed%=(L%-1-(poll%!4-y%)DIV32):ed%-=(ed%MO
D2)
12020 PROCclosewindow(edit%):edit%=0:PROCsplit
(ed%)
12030 $filename%=date$:$mtext%=detail$:$(mtext
%+23)=CHR$13+"£"+STR$(val)
12040 from%=&FF:fac%=&FF:to%=&FF:tac%=&FF:fz%=
29:tz%=50
12050 RESTORE20100:dialog%=FNcreatedialog(7)
12060 PROCseticon(dialog%,23-cr%,1+5*cr%):PROC
seticon(dialog%,ac%+1,3)
12070 PROCsplit(ed%+1):PROCseticon(dialog%,ac%
+9,3)
12080 ENDPROC
```

We use the same routine as the initial entry, but this time we do not wish to add another to the list. Therefore, a couple of extra lines need to be added to the FNcheckentry routine:

```
10600 IFed%>-1temp%=L%:L%=ed%
10650 IFed%>-1L%=temp%-2:ed%=-1
```

While we're at it, let's add another line to this same procedure:

```
10720 IFbal%PROCresizewindow(bal%,0,0,1224,L%*
32)
```

You may already have discovered that if you have the balance window open on the screen when you add another entry it remains the same size. In fact, the extra entry remains annoyingly just out of sight below the bottom border of the window.

The only way to view it is to close and re-open the balance window.

This new line calls a procedure that sets up a parameter block with the new size of the window and then calls *Wimp_SetExtent* to enlarge the window. As we shall see next month, this same call can be used to make a window smaller:

```
3500 DEFPROCresizewindow(handle%,bx%,by%,tx%,
ty%)
3510 !block%=bx%:block%!4=by%:block%!8=tx%:bl
ock%!12=ty%
3520 SYS"Wimp_SetExtent",handle%,block%3510!b
lock%=handle%:SYS"Wimp_GetWindowInfo",0,block
%:SYS"Wimp_OpenWindow",0,block%:ENDPROC
```

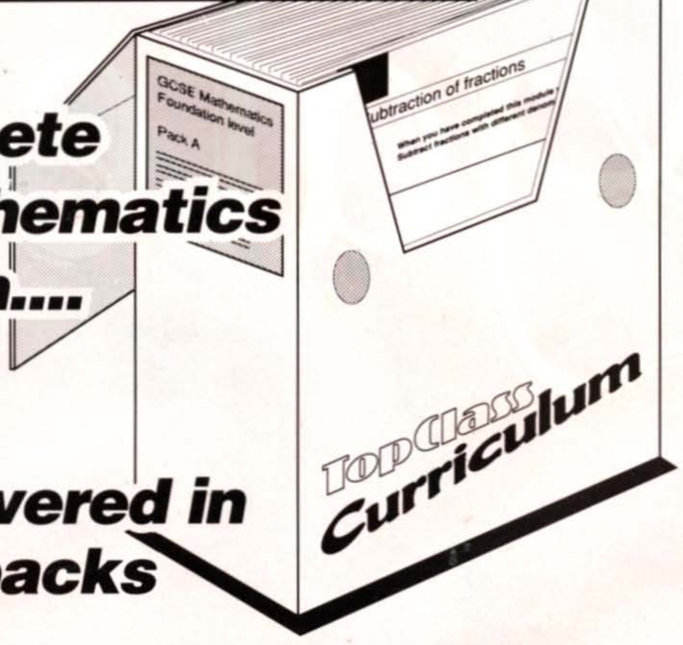
This procedure does not physically enlarge the window, it merely extends the total work area. To redraw the window, we have to issue an open window call, just the same as if we physically moved the window on the screen. For this we need a parameter block, and the easiest way of getting the necessary parameters is to use the *Wimp_GetWindowInfo* call.

● *Next month we will round off the series with a bit of drill on how to write Wimp programs, plus some suggestions on how to extend our accounting system.*

TopClass™ Curriculum

Computer assisted learning modules
For IBM PC/PS, compatibles, BBC, Nimbus

The complete GCSE Mathematics Curriculum....



....Covered in 9 packs

Teaching and Technology – hand in hand

Product summary & Order details

GCSE Mathematics Curriculum Product List

FCCM1	Foundation Level Maths Pack A
FCCM2	Foundation Level Maths Pack B
FCCM3	Foundation Level Maths Pack C
FCCM4	Intermediate Level Maths Pack A
FCCM5	Intermediate Level Maths Pack B
FCCM6	Intermediate Level Maths Pack C
FCCM7	Higher Level Maths Pack A
FCCM8	Higher Level Maths Pack B
FCCM9	Higher Level Maths Pack C
	TopClass Curriculum versions available for the IBM PS/2 range, PC compatibles such as Amstrad PC, the BBC micro and the RM Nimbus
FCCTM	TopMark Courseware monitoring program Available for IBM PC compatibles only Specify computer make and model when ordering

• Other subjects available soon - Phone for details.

The complete GCSE course in modular form

- *Can be linked into other maths schema, for example School Mathematics Project*
- *Provides special benefits for special needs*
- *Meets the requirements of TVEI (E) and C.P.V.E.*
- *Also proven in FE, Vocational Education and Special Education*
- *Competence Based Learning – provides information for local and national profiling requirements*
- *Co-ordinates with the recommendations of the National Curriculum Council*
- *Technology assistance across the Curriculum*

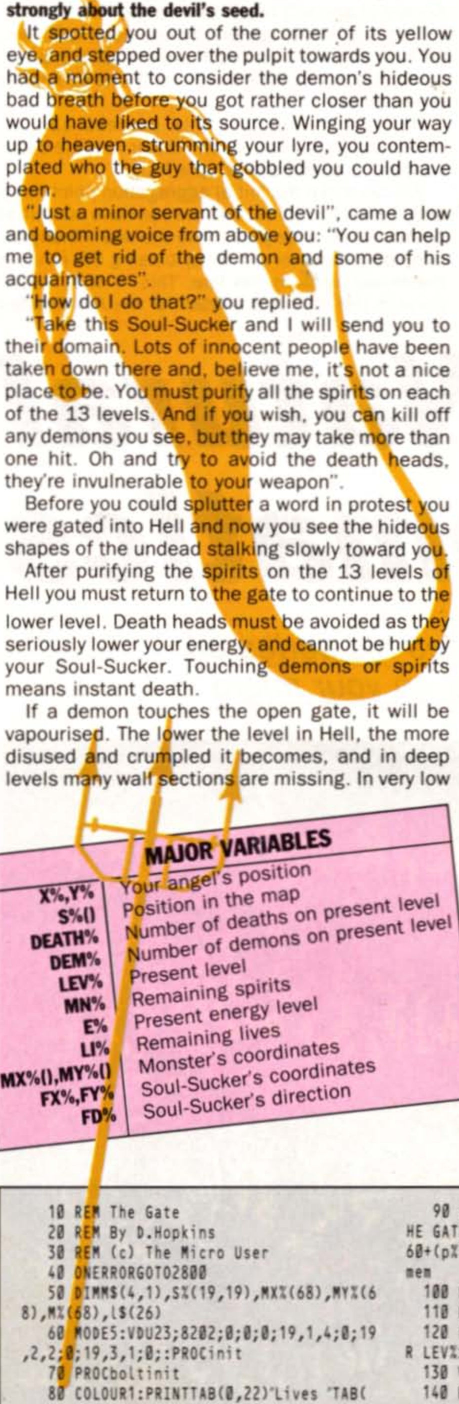
Phone today for your sample module – 0773 820011

Format pc

FORMAT pc Ltd Goods Road Belper Derbyshire DE5 1UU Tel: 0773 820011 Fax: 0773 820206

THE Gate

David Hopkins has one Hell of a test for gamers



YOU were, in your former life, a mild-mannered priest, biding your time on Earth by doing good and generally being a nice guy. Suddenly, while you were preaching in your little parish church, a gigantic red scaly demon jumped out of the ground and started to eat as many of the screaming congregation as it could get it's fiery claws on. Perhaps you shouldn't have spoken so strongly about the devil's seed.

It spotted you out of the corner of its yellow eye, and stepped over the pulpit towards you. You had a moment to consider the demon's hideous bad breath before you got rather closer than you would have liked to its source. Winging your way up to heaven, strumming your lyre, you contemplated who the guy that gobbled you could have been.

"Just a minor servant of the devil", came a low and booming voice from above you: "You can help me to get rid of the demon and some of his acquaintances".

"How do I do that?" you replied.

"Take this Soul-Sucker and I will send you to their domain. Lots of innocent people have been taken down there and, believe me, it's not a nice place to be. You must purify all the spirits on each of the 13 levels. And if you wish, you can kill off any demons you see, but they may take more than one hit. Oh and try to avoid the death heads, they're invulnerable to your weapon".

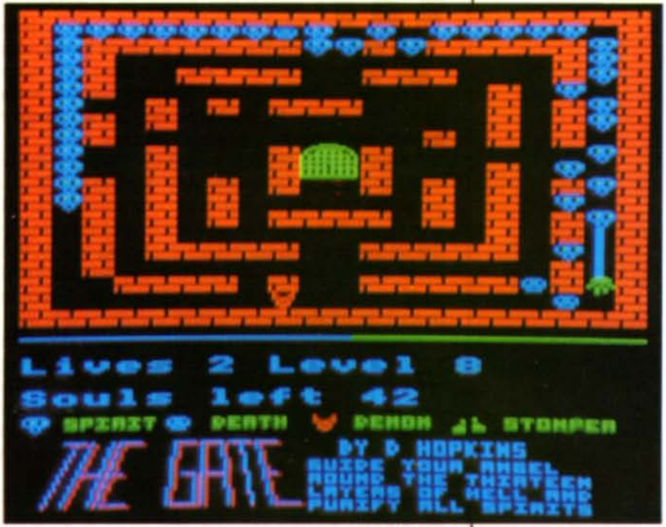
Before you could splutter a word in protest you were gated into Hell and now you see the hideous shapes of the undead stalking slowly toward you.

After purifying the spirits on the 13 levels of Hell you must return to the gate to continue to the lower level. Death heads must be avoided as they seriously lower your energy, and cannot be hurt by your Soul-Sucker. Touching demons or spirits means instant death.

If a demon touches the open gate, it will be vapourised. The lower the level in Hell, the more disused and crumpled it becomes, and in deep levels many wall sections are missing. In very low levels a creature known as a Stomper occasionally appears and destroys a wall section before disappearing.

MAJOR VARIABLES

X%,Y%	Your angel's position
S%()	Position in the map
DEATH%	Number of deaths on present level
DEM%	Number of demons on present level
LEV%	Present level
MN%	Remaining spirits
E%	Present energy level
LI%	Remaining lives
MX%(),MY%()	Monster's coordinates
FX%,FY%	Soul-Sucker's coordinates
FD%	Soul-Sucker's direction



Lives 2 Level 8
Souls left 42
SPIRIT
DEATH
DEMON
STOMPER
THE GATE
BY D HOPKINS
GUIDE YOUR ANGEL ROUND THE THIRTEEN LAYERS OF HELL AND PURIFY ALL SPIRITS

The keys to use are:

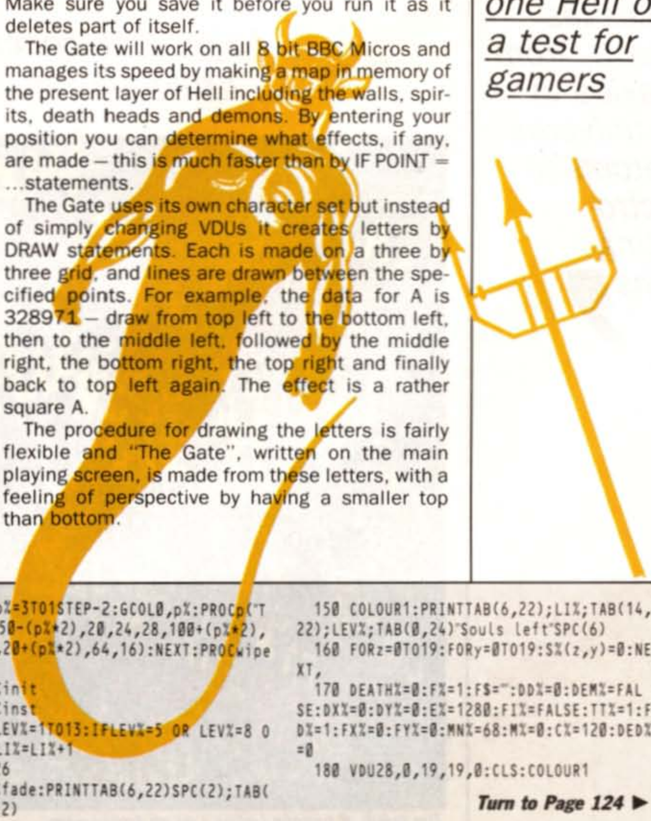
```
      Z: left    X: right
      *: up      /: down
Return: Activate Soul-Sucker.
```

Type the game in and check it with Get it Right! Make sure you save it before you run it as it deletes part of itself.

The Gate will work on all 8 bit BBC Micros and manages its speed by making a map in memory of the present layer of Hell including the walls, spirits, death heads and demons. By entering your position you can determine what effects, if any, are made – this is much faster than by IF POINT = ...statements.

The Gate uses its own character set but instead of simply changing VDUs it creates letters by DRAW statements. Each is made on a three by three grid, and lines are drawn between the specified points. For example, the data for A is 328971 – draw from top left to the bottom left, then to the middle left, followed by the middle right, the bottom right, the top right and finally back to top left again. The effect is a rather square A.

The procedure for drawing the letters is fairly flexible and "The Gate", written on the main playing screen, is made from these letters, with a feeling of perspective by having a smaller top than bottom.



```
   10 REM The Gate
   20 REM By D.Hopkins
   30 REM (c) The Micro User
   40 ONERRORGOTO2800
   50 DIMM$(4,1),S%(19,19),MX%(68),MY%(6
8),M%(68),L$(26)
   60 MODE5:VDU23;8202;0;0;0;19,1,4;0;19
,2,2;0;19,3,1;0;:PROCinit
   70 PROCboltinit
   80 COLOUR1:PRINTTAB(0,22)"Lives "TAB(
8,22)"Level "
   90 FORp%=3TO1STEP-2:GCOL0,p%:PROCp("T
HE GATE",150-(p%*2),20,24,28,100+(p%*2),
60+(p%*2),20+(p%*2),64,16):NEXT:PROCwipe
mem
  100 PROCinit
  110 PROCinst
  120 FORLEV%=1TO13:IFLEV%=5 OR LEV%=8 O
R LEV%>9 LI%=LI%+1
  130 VDU26
  140 PROCfade:PRINTTAB(6,22)SPC(2);TAB(
14,22)SPC(2)
  150 COLOUR1:PRINTTAB(6,22);LI%;TAB(14,
22);LEV%;TAB(0,24)"Souls left"SPC(6)
  160 FORz=0TO19:FORy=0TO19:S%(z,y)=0:NE
XT,
  170 DEATH%=0:F%=1:F$="":DD%=0:DEM%=FAL
SE:DX%=0:DY%=0:E%=1280:F1%=FALSE:TT%=1:F
D%=1:FX%=0:FY%=0:MN%=68:M%=0:C%=120:DED%
=0
  180 VDU28,0,19,19,0:CLS:COLOUR1
```

Turn to Page 124 ▶

Natural mathematics

Mike Cook concludes his series on exploring fractals on your micro

WE looked last month at a method of producing deterministic fractals – ones where the shape is ordained by the rules we invent – and no matter how many times we run the program the same fractal will always be produced. Now we'll consider fractals generated by a random process.

Diffusion limited aggregation sounds quite frightening but is really very simple. It is an attempt to model the way certain physical processes behave, from collections of galaxies in the universe to atoms in electroplating baths. Put quite simply it is a process whereby small bits of stuff come together – aggregate – to become large bits of stuff.

The process is easy to understand and simulate on a micro. Suppose we have a particle moving randomly and it happens to touch another, they can stick together. This group of two particles is larger than a single one and so is more likely to be touched by a third and so on. Soon we have an aggregation of particles – a large lump of stuff.

But what shape will it be? This is where micro simulation comes in – we can write a program and see. As you can probably guess from this series we, suprisingly, come up with a fractal shape.

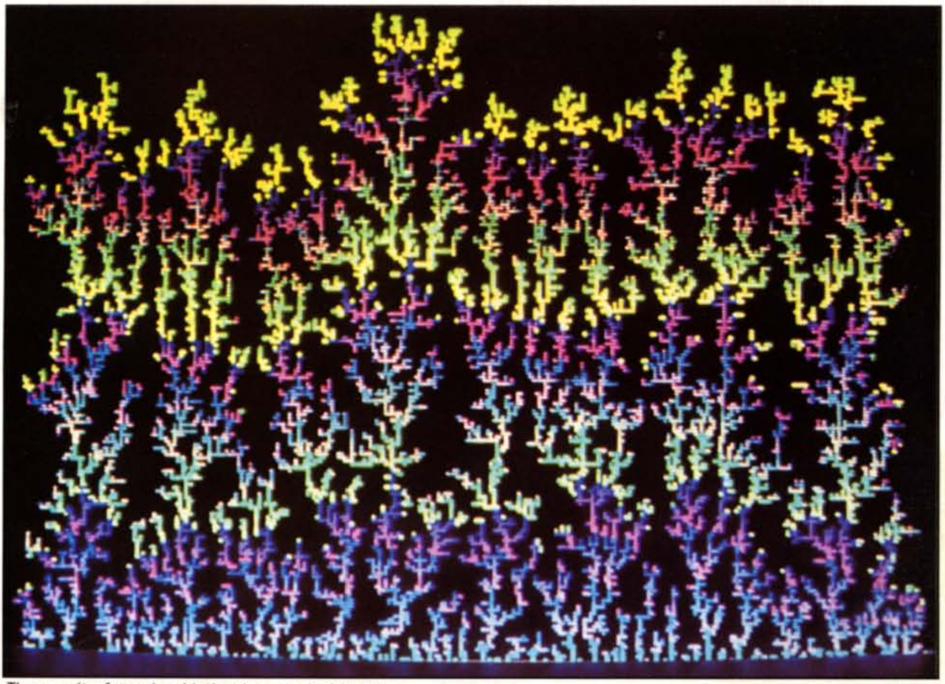
In its simplest form the micro plots a single pixel in the centre of the screen. Then a point is chosen at random and the surrounding pixels are tested to see if they have been plotted. Normally they have not, so the pixel position is moved one pixel in a randomly chosen direction and the surrounding pixels are tested again. Eventually it will come adjacent to our initial seed pixel so we plot that position and start again. Soon a shape will begin to emerge.

This random movement by one pixel is known as a random walk and such are the laws of probability that it will always eventually end up next to a plotted pixel.

However in practice this process can be exceedingly slow and we can tinker with the basic concept to speed things up a little.

We can make the initial aggregation point not a single pixel but a line, then we can have our initial point chosen to be just above the line. Finally we can add a touch of gravity by biasing the random movement towards the line. This is what I have done in Listing I. It is written for the Archimedes

An attempt to model the way certain physical processes behave, from galaxies in the universe to atoms in electroplating baths’



The result of running Listing I on an Archimedes but can be modified to run on an 8 bit BBC Micro by making the amendments in the panel below.

The procedure –IAG draws the title and the initial short aggregation line. The array W%() contains the random walk increment for movements of up, down, left and right. Note that no diagonal movement is catered for. The second element in the array specifies the X and Y increment.

The array holds 10 identical moves in each direction. In order to add a little gravity, lines 200 and 210 bias the selection in the down direction. Now we generate a random position in the X direction – line 250 – and fix the Y position just above our initial line.

Now lines 290 to 360 random walk the particle until it is adjacent to another. Note that to add a little interest to the display each step in the walk is plotted on the screen. After the particle has stuck to another it is plotted again and we increase the height above the line from which we drop new particles, lines 370 to 380. When this point exceeds 1018 the particle has reached the top of the screen and we can save the resulting picture.

PROC–COL in lines 480 to 540 change the colour of the particle depending where it was dropped, and this results in a spread of colours throughout the structure.

You can tinker with this program, for example you can try the effects of altering the amount of gravity or allowing for diagonal movement and testing. You can alter lines 450 and 460 to draw a line across the whole of the screen so that you will get more of a forest than a single specimen. When you do this notice how the few larger growths shade the many initial smaller growths. If you had enough screen space eventually just a single growth would dominate.

The result of running the program for three hours on an Archimedes is shown opposite. You can see by the shape that it is a fractal. It's the same sort of shape that you see in a lightning strike – turn it upside down – or in dendrite crystal growth.

Notice that there is a symmetry about the shape but nobody knows quite why this process does not easily produce loops. It seems random and yet structured at the same time – one of the true hallmarks of a fractal. We have used random movement to generate the shape, yet the process used imposes its own structure.

If you would like to explore this further write a program that aggregates to a single point at the centre of the screen and bias the gravity so that particles fall in toward the centre. This will take even longer to run. When I tried it two days of running on a BBC B failed to produce anything larger than a 5p piece.

If you only have access to an 8 bit BBC Micro never mind, you could make its speed a feature and keep it running as a conversation piece on "How the fern is looking today".

To run Listing I on an 8 bit BBC Micro delete line 520 and change the following lines to:

```
 50 MODE 1
400 *SAVE FERN 3000 8000
510 P%=C% DIV 256
530 GCOL 0,P%
```

Listing I

```
   10 REM > Agrate
   20 REM Diffusion Limited Agragation
   30 REM By Mike Cook
   40 REM ============================
   50 MODE13
   60 PROC_IAG
   70 REM RANDOM WALK AGRATATOR
   80 DIM W%(40,1)
   90 D%=RND(-TIME)
  100 C%=1
  110 FOR A%=1 TO 40
  120 FOR B%=0 TO 1
  130 READ W%(A%,B%)
  140 NEXT
  150 C%=C%+1
  160 IF C%=5 THEN RESTORE 180:C%=1
  170 NEXT
  180 DATA 0,4,0,-4,4,0,-4,0
  190 REM ADD A DRIFT DOWNWARDS
  200 W%(1,1)=-4
  210 W%(5,1)=-4
  220 YD%=8
  230 REM GENERATE AN INITIAL POSITION
  240 XB%=1279:XS%=0
  250 X%=RND(XB%)
  260 Y%=YD%
  270 PLOT 69,X%,Y%
  280 REM BEGIN THE WALK
  290 REPEAT
  300 PLOT 71,X%,Y%
  310 R%=RND(40)
  320 X%=X%+W%(R%,0)
  330 Y%=Y%+W%(R%,1)
  340 PLOT 69,X%,Y%
  350 T%=POINT(X%,Y%+4) OR POINT(X%,Y%-4
) OR POINT(X%+4,Y%) OR POINT(X%-4,Y%)
  360 UNTIL T%<>0
  370 IF T%=-1 THEN PLOT 71,X%,Y%
  380 IF T%<>-1 AND Y%+16>YD% THEN YD%=Y
%+16:PROC_COL(YD%)
  390 IF YD%<1018 THEN GOTO 250
  400 *SCREENSAVE Fern
  410 END
  420 DEF PROC_IAG
  430 REM INITAL AGRATION POINT
  440 PRINT"Fractal Fern       By Mike Co
ok"
  450 MOVE 630,0
  460 DRAW 650,0
  470 ENDPROC
  480 DEF PROC_COL(C%)
  490 LOCAL T%,P%
  500 C%=1015-C%
  510 P%=C% DIV 16
  520 T%=(C% MOD 16) * 16
  530 GCOL 0,P% TINT T%
  540 ENDPROC
```

Get it right!

```
 10 =    0 0 | 190 =    0 8 | 370 = DA01 F
 20 =    0 0 | 200 = 73EC 4 | 380 = CC83 7
 30 =    0 0 | 210 = B22A 9 | 390 = EA05 1
 40 =    0 0 | 220 = B087 1 | 400 = 858E A
 50 = 6054 4 | 230 =    0 1 | 410 = FD2E 1
 60 = 5FE2 4 | 240 = 1917 1 | 420 = C18E B
 70 =    0 4 | 250 = 5531 4 | 430 =    0 B
 80 = 669E 3 | 260 = 736A 0 | 440 =  266 7
 90 = A744 4 | 270 = B9A7 1 | 450 = B9A3 4
100 = CDCD 0 | 280 =    0 1 | 460 = 1F35 3
110 = 7D17 5 | 290 = BFBA 3 | 470 = ED0F 4
120 = FA92 C | 300 = 6DD9 0 | 480 = C071 1
130 = 4374 F | 310 = E986 E | 490 = 4045 5
140 = 2C83 6 | 320 = 7684 F | 500 = 13E1 0
150 = 3AEB D | 330 = E69D 5 | 510 = 10AC 1
160 = 5BC1 9 | 340 = B9A7 5 | 520 = 64BC C
170 = 2C83 2 | 350 = B4E6 F | 530 = 660D 7
180 = 1381 8 | 360 = 47A8 5 | 540 = ED0F A
```

> *It seems random yet structured at the same time – one of the true hallmarks of a fractal*

IMPRESSION

One solution for all your word processing AND desk top publishing requirements.

IMPRESSION

Impression is supplied with the new outline font manager, and so is capable of producing outstanding quality prints on everything from dot matrix printers to typesetters.

IMPRESSION

Impression is the first word processor designed for RISCOS—it multi-tasks with other RISCOS applications and supports direct, in-memory data transfer between them. For example, a diagram can be imported from Draw by simply dropping its file icon onto a frame in Impression—the diagram is then immediately transferred to Impression. The same applies to Edit and Paint.

IMPRESSION

Impression is a fast and very compact program, which means that it is ideally suited to a 1MByte machine. It is extraordinarily powerful—able to handle all documentation needs from simple one sided letters to the most complex magazine layout. Unlike other DTP programs, Impression is also capable of handling long documents with ease. Yet despite its versatility, Impression remains supremely easy to use.

Ask for our detailed brochure or come and see Impression in action at the BBC Acorn User Show

Computer Concepts Ltd

Gaddesden Place, Hemel Hempstead, Herts. HP2 6EX.
Tel: (0442) 63933. Fax: (0442) 231632.

See us at
The BBC Acorn User Show
Alexandra Palace
21-23 July 1989
Stand No. 34/36

There's a new sound around

Expert musician Ian Waugh puts an Archimedes Midi sequencer through its paces

Product: Studio 24 Plus
Price: £99
Supplier: EMR, 14 Mount Close, Wickford, Essex SS11 8HG.
Tel: 0702 335747

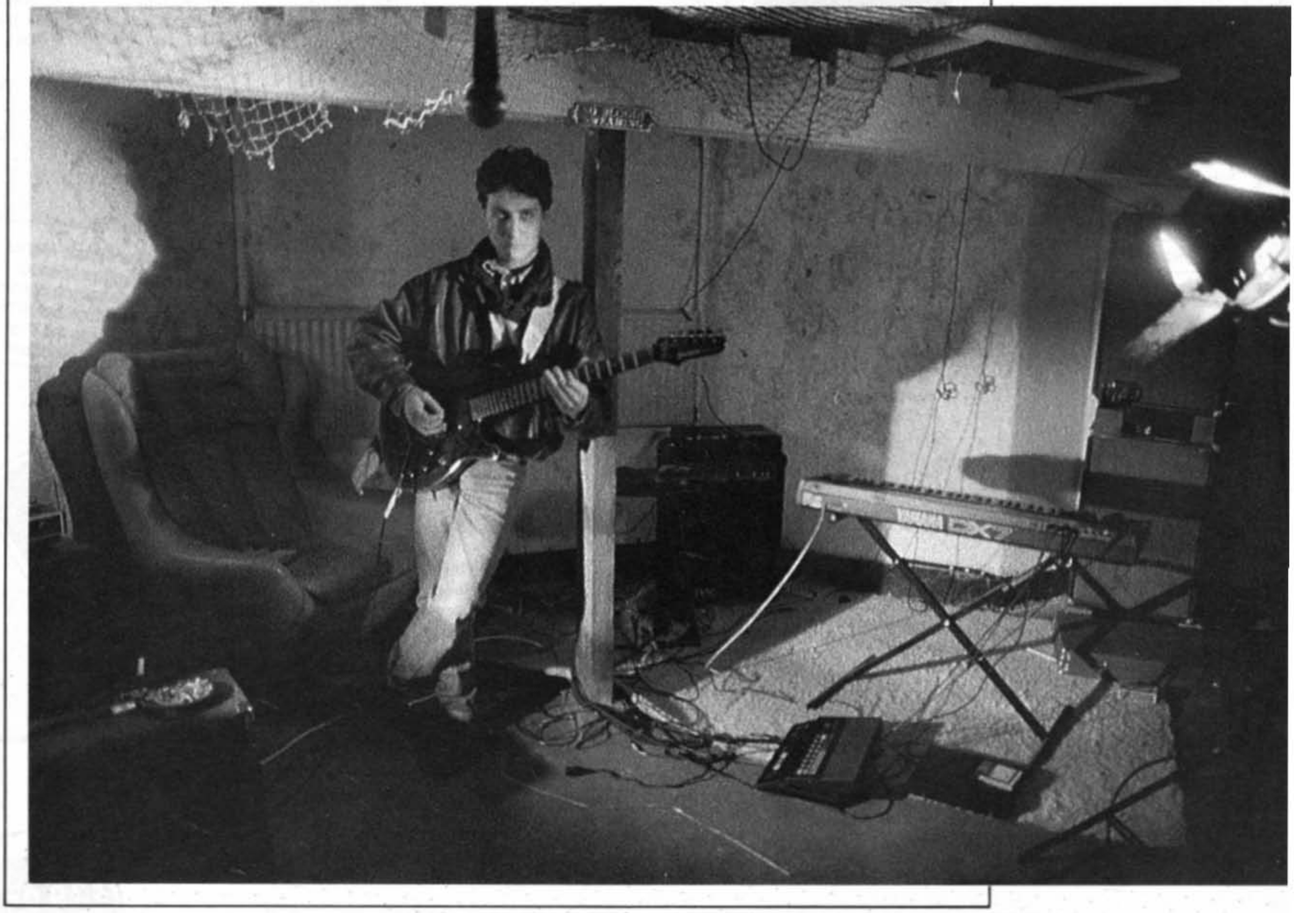
THE music potential of Acorn's Archimedes is, without a doubt, enough to make any musician drool. However, music software has been rather a long time in coming and few companies are actively engaged in developing it. EMR is a notable exception and – having produced Midi programs for just about every make of micro you can think of – was the first company to begin development for the Archimedes.

Studio 24 Plus forms part of EMR's Arpeggio Music System which has been promoted in outline for more than a year. It's the first major module in the suite to see the light of day and the manual says it is designed for home, school and semi-pro use.

There's no mention of the professional user, although the potential of a music system running on the Archimedes is enormous. In conjunction with a hardware developer, however, EMR is currently working on Megastudio – version 3 of Studio 24 Plus – which will support 8064 Midi channels. Then all you'll need are the instruments to use with it.

The review copy of Studio 24 Plus is version 1.00. Further updates are in the pipeline and version 2 will probably sell for around £149 and will support Render Bender pictures, full multitasking control and extra edit pages. Meanwhile, the current version will work quite happily with the Archimedes' internal sounds, but to make music

Turn to Page 57 ▶



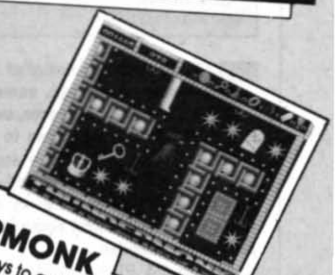
THE MINERVA COLLECTION

Archimedes Games

JET FIGHTER

Alone on a forgotten planet you must defend yourself against all comers whilst rebuilding your broken rocket ship, then fuel it and take off to the next level. With the aid of your jet-powered backpack you move around to collect the various parts of the rocket. You must avoid collision with all other objects. Build and then fuel your rocket to take off to the next level. Absorbing fun for all the family.

NEW



THUNDERMONK

An intriguing new game with a variety of ways to achieve the ultimate goal of recapturing the Lonesome Monk's Monastery from the grip of the Evil Demons. Lead The Lonesome Monk's army through the labyrinths of the Monastery and recapture all the great treasures hidden in the building. Keep your eyes peeled for the secret passages. You too could walk through walls!

FREDDY'S FOLLY

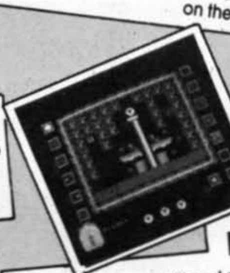
An enchanting game using animated graphics. Just watch the little men load the canon and pull it along. Notice the celebration when they win! Colourful fun for all the family. Sir Freddy is sneaky and envious of your castle so plans to bomb it with a fleet of balloons. You built a battlement to shoot down Sir Freddy in his balloon. Sir Freddy then hired several Gun ships to shoot your canon crew. Defend your castle and shoot down the balloons and the invading ships.

ORION

Skillfully manipulate Orion, the latest air to air combat interceptor, to defend your planet against the tide of marauding aliens. Shoot them down before its too late! Score points by saving your men before they are changed into mutants – otherwise they will turn against you. Contains Baiters, Pods which explode into Swarmers and waves of Bombers. Orion is a fast and furious scrolling 'shoot em up' game based on the all time arcade classic.

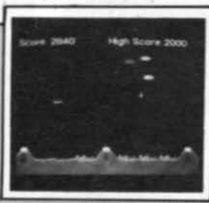
MISSILE CONTROL

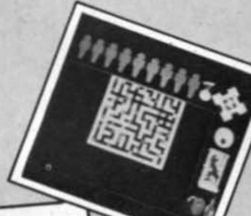
Missile Control is a classic arcade game written for the Archimedes to make full use of the advanced graphics and sound, while remaining faithful to the original concepts of the game. The Player is in control of the missile launches and must do the utmost to protect the cities from the incoming missiles. On each subsequent attack further planes, satellites or 'smart' missiles attack the target cities.



HOVERBOD

Hoverbod is a traditional maze adventure in the style of the classic Manic Miner, yet it is of stupendous proportions. Hoverbod, the yellow sperical droid, has been banished from the planet Zingle and goes in search of some stolen treasure. The player must guide him through the perils which befall him and help him puzzle his way through the eight different levels to the final quest level. But beware . . . the Ibbles and Squibbles start to materialise!!!!





MINOTAUR

The Minotaur maze game is aimed at a market for children or adults who want a game where quick shoot-out reactions are not necessary. Theseus walks around the Labyrinth, collecting items to assist in the search of the ill fated men which have been provided as food for the Minotaur. The ultimate aim is then to kill the Minotaur and lead the men out of the Labyrinth to safety. The maze size is fully definable by the User. Games may be saved and reloaded for use at a later time.

NEW

£19.95

IBIX THE VIKING

You'll have as much fun designing this game as playing it! Play to your own level – child/adult/designer versions all on the one disc. Choose from the pre-programmed games or design your own. A fascinating and absorbing arcade game for all the family. A 'Designer Game' of new dimensions!

MINERVA
SOFTWARE

69 SIDWELL STREET · EXETER EX4 6PH · TEL: EXETER 0392 437756 · FAX: 0392 421762

£14.95 each

IBIX £19.95

◀ From Page 55

with Midi equipment you'll also need a Midi interface. You can use either Acorn's or EMR's but the manual warns that the Acorn Midi add-on to its I/O podule will not work.

On booting the program your first task is to allocate memory for the WFS – waveform filing system for the internal sounds. Then you get a digitised picture of EMR's home studio followed by the main screen.

Control is mostly by mouse although filenames and some numbers must be entered via the keyboard. The mouse pointer is a hand holding a conductor's baton, and as you move it from icon to icon a description of their function appears in a Help window at the bottom of the screen. The main screen is fairly crammed with icons but going through with the onscreen Help facility once or twice soon tells you what everything is.

In Studio 24 Plus a piece of music is constructed from a number of patterns, each containing up to 24 tracks, which are shown at the top of the screen. The patterns can then be chained together using the Arrange function to produce a finished Song. Quite complex pieces of music can be constructed using only one pattern and its 24 tracks – the digital equivalent of a 24 track tape recorder. The Arrange function, therefore, greatly increases your music construction potential.

Let's make music

At start-up the program is ready to record on track one of pattern one. Click on the Record icon and then on Start. You get a four beat count-in – which can be altered – and off you go on your Midi instrument. Click on Stop or press the spacebar when you've finished. Click on another track and record another music line until the pattern is complete.

The metronome plays via Midi, which means you'll probably get a pitched sound on one of your instruments – the manual suggests you use a drum machine to keep time, although not everyone will have one. You can alter the loudness and pitch of the metronome, but an option to output a click through the machine's internal speaker would have been useful. However, you can fudge this by using one of the internal sounds, preferably playing through an external speaker. It would have been helpful, too, if the downbeat was accented.

You can adjust the tempo and make a transposition during playback, but only from the keyboard – the mouse effectively becomes inoperative. It would have been nice to be able to alter instruments, channel settings and so on, on the fly. The Archimedes certainly has the power, so why not use it?

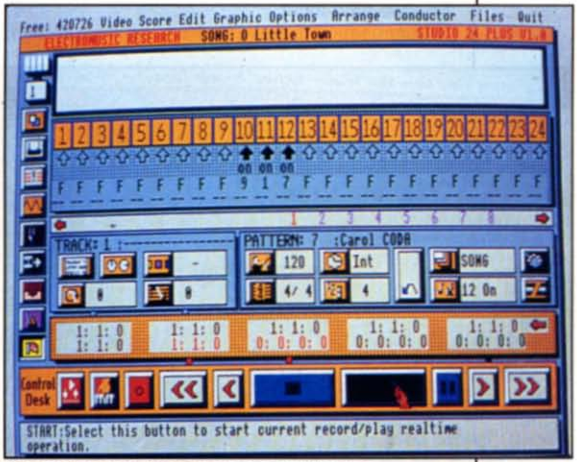
A VU meter display at the top of the screen shows which tracks are active during playback and you can toggle a keyboard into this area which shows which notes are playing.

Under the VU/keyboard display is the very comprehensive track parameters window. When set to F – for Full – a track will record data coming in on any or all Midi channels, but you can set it to receive on a single one, too. You can also set the channel on which each track transmits. If set to F it will transmit the data on the same channel(s) it was recorded. You can Mute and Solo tracks, too.

Here you also select the active track for recording and the number appears in the track display window. I would have liked to have seen the track box change colour to show at a glance which one was active. Usefully, you *can* see at a glance which tracks have been recorded on.

If you use EMR's Midi 4 Interface you can assign each track to one of four different Midi outputs, giving you access to 64 channels.

A Midi Thru function sends data arriving at the Midi In socket back through the Out socket on the channel of the currently-selected track. This allows you to play a master keyboard and hear what you are playing on an expander. It's a great idea, but it only works during recording. If it was always active you could test a line or a sound before going into Record mode.



START:Select this button to start current record/play realtime operation.

The main screen is fairly crammed with icons

A Midi filter allows you to remove unwanted Midi information such as control and program changes, pitch bend and aftertouch information. Below the track display are the track and pattern windows. Here you can name tracks and patterns, select internal sounds, set loops, transpositions and the number of beats count-in, send program change numbers, alter the tempo and time signature and select internal or external clock to let you drive the program from an external sequencer or drum machine. Loops are individual to each track, so you can set a repeating bass line against a melody line.

Here you also set the stereo position and pitch offset of the internal sounds, and there's a handy Undo function which you may need after quantising a track – explained in a moment.

Below these windows are the locators which are used to select positions within a track. They are used to define track start and end positions and left and right locators isolate sections of the track for editing purposes. It's a highly-numeric business – but that's the way it is with locators.

When you've constructed some patterns you go into Song mode and string them together. This is easy – it's just a matter of clicking a list of patterns into the Arrange list. The Conductor function allows you to specify a range of tempo changes for the parts of a Song – neat. There is an excellent demo of *O Little Town of Bethlehem* on

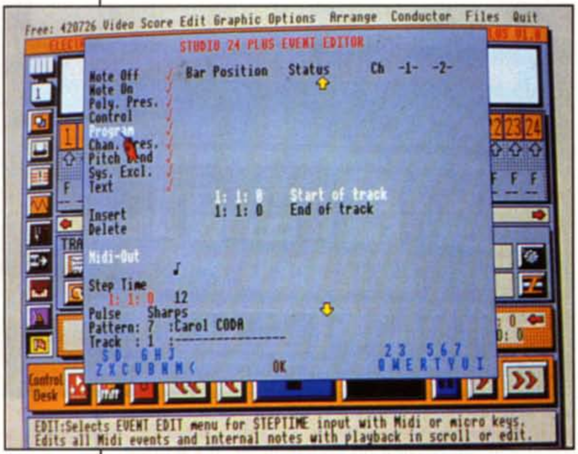
Turn to Page 58 ▶

◀ From Page 57

the disc which shows how the Arrange function works.

As well as recording via Midi, you can record from the micro keyboard – reminiscent of several music programs for the 8 bit BBC Micro. It is, however, a far from ideal method of music input – if you've tried it you'll know this to be true – and you won't be able to record anything of any complexity this way. It is, perhaps, more useful for step-time input.

Quantisation is available from the main screen.



EDIT:Selects EVENT EDIT menu for STEPTIME input with Midi or micro keys.
Edits all Midi events and internal notes with playback in scroll or edit.

The editor allows you to insert a variety of Midi events

It is used to correct notes which are slightly out of time by pulling them on to the nearest beat. In operation you simply select a quantise value between two and 64. It would have been a little more friendly if the actual note durations or names had been used and it's not a particularly sophisticated function. For example, quantise affects the whole of the track, and there is no tolerance allowance.

You can perform copy and paste operations using a clipboard and the locators. As with many aspects of Studio 24 Plus, this is also quite a numeric operation. Editing, however, is comprehensive, even allowing you to insert a variety of Midi events – again displayed in numeric form. – in the event list. The timing of notes is shown in bar, beat and click format and Note On and Note Off are shown as two separate events – which, of course, they are. It would, perhaps, have been more helpful if the actual durations of the notes were shown.

You can enter notes in step-time by clicking on a note value to cycle through the available durations and then playing a note via Midi or on the qwerty keyboard. A list of available durations would have speeded note entry a little.

File handling is extremely comprehensive and you can save and load no less than eight aspects of your music although you cannot use the same filename to save different file types.

As well as output via Midi, you can allocate up to eight internal voices to the tracks. You can load sounds from EMR's SoundSynth program or an EMR Creations disc and use them in conjunction with sounds played via Midi.

You have access to up to 32 sounds, but they must be compatible with EMR's WFS created with the SoundSynth program. In practice the number of sounds you can use depends upon the space you allocate to them when you boot the program.

You can alter the velocity (volume) of both Midi and internal sounds although this is expressed as a percentage rather than the 0-127 velocity range used by Midi instruments.

Confusing style

The manual is quite informative, although its English is a little stilted in places. The absolute newcomer is invited to read EMR's Midi, Micros & Music booklet – £1.75 – or some other book about Midi. I'd certainly confirm that some background knowledge is desirable, as the manual begins by telling you what Studio 24 Plus can do – the Midi codes it handles, and so on – before it gets down to business.

I must say, too, that the manual is laid out in my least favourite manner – in that it tells you what the program does before telling you how to use it. It refers to controls and options on the screen even before it tells you how to boot the program. This just leads to confusion and frustration. There is no section that could really be called a tutorial, and in places it has a tendency to jump from topic to topic. Some attention to layout and format could make life easier for the newcomer.

As there are currently no other Midi sequencers for the Archimedes, the Studio 24 Plus has the market to itself. But Studio 24 Plus is really not finished yet. The EMR blurb gives tantalising glimpses of video interfaces, scorewriters, the direct entry of music using a scanner – I can't wait to see this – and a SMPTE interface which is a universal time-keeping system used for professional applications in the film and recording world.

It is good to see a reasonably-priced piece of music software, unlike the £250 to £500 demanded by, admittedly pro, sequencers for other machines. If Studio 24 Plus helps keep down the price of Midi software on the Archimedes it will have done a good job.

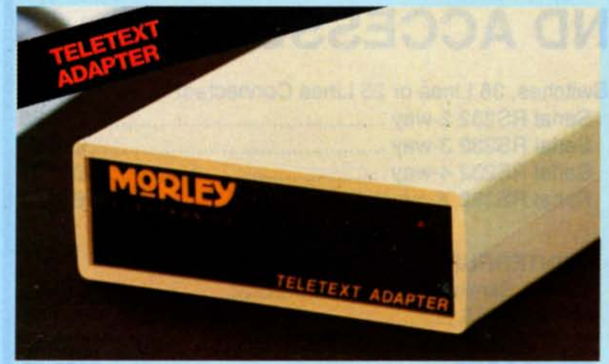
Meanwhile, investigate Studio 24 Plus by all means, but be aware that the music potential of the Archimedes has yet to be fully tapped.

SUMMING UP

Studio 24 Plus has many powerful features and is the only Midi sequencer currently available for the Archimedes. But it doesn't make the best use of the machine's abilities. Implementation and user-interface in several areas could be improved. Many operations, especially editing, are highly numeric.

If you have an Archimedes and want to use it to make music via Midi you have no choice at the moment. In spite of these criticisms, Studio 24 Plus is worth taking for a test drive, although Midi music on the Archimedes has yet to come of age.

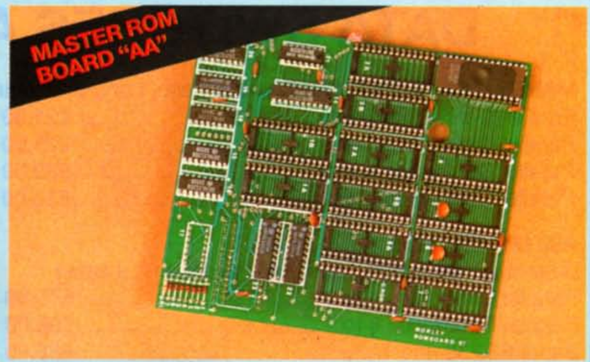
MORLEY ELECTRONICS



TURN YOUR BBC INTO A TELETEXT RECEIVER

☐ State-of-the-art unit.
☐ ATS (Advanced Teletext Software) supplied on ROM.
☐ Free Telesoftware. Download and use high quality software.
☐ Free use of automatically updated massive database.
☐ Digital tuning – no manual controls.
☐ Comprehensive user guide.
☐ Allows standard Teletext pages to be saved and printed.
☐ World's biggest selling adapter.

BBC/Master	**£104**
Compact	**£120**
RML Nimbus	**£104.20**
Optional PSU	**£9.50**



THE ULTIMATE ADD-ON FOR ALL SERIOUS MASTER USERS

☐ No more need to switch your computer off to insert a cartridge containing a required ROM.
☐ With 2 cartridges and a ROM board, a staggering 32 ROM images installed and accessible at any time.
☐ Allows up to an additional 8x16k and 4x32k ROMS installed inside your computer still leaving your cartridge slots free.
☐ Master control ROM which includes a clever file transfer program allowing files to be transferred between DFS and ADFS formats or vice versa.

£40

EPROM PROGRAMMER "V2"
MORLEY

☐ Attractive state-of-the-art unit.
☐ Totally software controlled. Eprom creator utility also available.
☐ Programmes 27128/2764/27256 Eproms: 12 and 21 volt.
☐ Includes full ROM management software with numerous features.

£30

MASTER SMART CARTRIDGE
SMART CARTRIDGE
WARNING
Please insure that this label faces the back of your Master Computer.
MORLEY

☐ Fast to install and operate.
☐ User-friendly menu driven software.
☐ Built-in features include:
  - Autosaves computer's entire memory.
  - Freeze program at any point.
  - Screen dump (any mode) to printer or disc.
  - Allows most protected software to be backed up including disc to tape and tape to disc.
  - Extensive range of useful FX calls.

£30

MORLEY HARD DISC DRIVES
MORLEY

THE BEST DISC DRIVES AT AFFORDABLE PRICES

☐ Completely compatible with BBCs, B+s and Masters fitted with ADFS.
☐ High output switched mode power supply.
☐ Free utility disc incl. Format; Verify; Archive and Park.
☐ Whisper quiet internal fan.

20meg £370 30meg £420 40meg £500

MASTER CARTRIDGES

☐ The full range of Care Master Cartridges:	
Dual 2 x 16k	£9.00
Quad 4 x 16k	£14.00
Duet 2 x 32k	£12.00
32k NON VOLATILE RAM Cartridge (ideal for Spellmaster Dictionary)	£33

SOFTWARE ... SOFTWARE ... SOFTWARE ...

M/B SOFTWARE

☐ DESIGN 7+. Commonly accepted as the brand leader in Teletext screen programs	£8.60
☐ DESFAX. Design and run your own Teletext information/display system	£17.40
☐ MASTERFAX. Enhanced Desfax program on the Master or compact	£26.00
☐ MASTERCOPY. A must for any Master or Compact owner. Allows simple, intelligent file transfer between ADFS and DFS systems. You'll wonder how you managed without it	£11.20

MORLEY SOFTWARE

☐ Teletext utility disc. Includes auto downloader, screendump, etc.	£5.20
☐ Eprom utility disc. Put all your favourite routines into sideways ROM, both basic and machine code	£5.20

COMPUTER CONCEPTS

☐ Spellmaster	£51.30
☐ Mega 3	£85.00
☐ Interword	£49.00
☐ Interbase	£60.00
☐ Intersheet	£49.00

Plus full range.

CONSUMABLES

☐ 27128 Blank Eproms	£4.20
☐ 5¼ Floppy Discs x 10	£5.00
☐ 3½ Floppy Discs ··	£10.00

The Morley range includes a full range of Amstrad/IBM peripherals. Telephone for details.
ALSO AVAILABLE FROM ALL GOOD ACORN DEALERS

COMING SOON...
Master Speech Cartridge

TO ORDER...

CARRIAGE: £1 on all orders. £3 on larger items (adapters).

VAT: UK customers please add 15% to cost incl. carriage.

BY POST: Enclose cheque made payable to MORLEY ELECTRONICS LTD.

BY PHONE: By quoting your ACCESS or VISA card number.

Goods usually despatched by return.

Government and Education orders welcome.

Morley House, Off Norham Road, North Shields, Tyne & Wear NE29 7TY. Tel: (091) 257 6355. Fax: (091) 257 6373

PRINTER BUFFERS
DATA SWITCHES AND ACCESSORIES

MANUAL DATA SWITCHES (Metal case, Long life Rotary Switches, 36 Lines or 25 Lines Connected)

Parallel Centronics 2-way	£21.00
Parallel Centronics 3-way	£25.00
Parallel Centronics 4-way	£30.00
Parallel Centronics X-over	£30.00

AUTO SWITCHES

(Automatic Switching, form feed, select, metal case)

Parallel Centronics 4 to 1	£75.00
Parallel Centronics 8 to 1	£96.00
Serial RS232 4 to 1	£80.00

PRINTER BUFFERS

(Functions: Copy, Bypass, Selftest, Reset, Port Selectable)

Parallel only available

64K 1 input to 1 output	£70.00
64K 2 input to 1 output	£90.00
256K 1 input to 1 output	£140.00
256K 2 input to 1 output	£160.00
256K 4 input to 2 output	£256.00

CABLES 2mtr AND ACCESSORIES m-Male – f-Female

25m to 36m IBM type	£7.95
BBC 2mtr Ribbon	£4.50
36m to 36m centronic	£8.50
25 way f to 25 way f gender	£5.25
9 way f to 25 way m at gender	£7.50

3½"

DS/DD 135TPI
100% Certified
Lifetime Guarantee

BENCHMARK BRANDED

10	£12
20	£20
50	£44
100	£84
200	£160
500	£398

Serial RS232 2-way	£19.50
Serial RS232 3-way	£24.00
Serial RS232 4-way	£28.00
Serial RS232 X-over	£28.00

UNINTERRUPTIBLE POWER SUPPLIES

350 VA Slimline * 10/22	£287.00
400 VA *5/15	£298.00
550VA Slimline *7/15	£350.00
800 VA * 5/15	£556.00
1000 VA * 5/12	£625.00

Transfer Time<4 milliseconds
Overload Protection
Line Surge Protection
Noise Attenuation
British Standard Output Sockets
6 feet Power Cord with Plug

* Load Times Full/Half Load

Protects your computer system from power problems, no more loss of data due to power failure

5¼"

DS/DD 96/48TPI
100% Certified
Lifetime Guarantee

BENCHMARK BRANDED

25	£11
50	£20
100	£36
200	£70
500	£170
1000	£300

DISK BOXES (Lockable inc. 2 keys and dividers)

3.5" 40 capacity	£6.25
3.5" 80 capacity	£7.25
3.5" 100 capacity	£8.25
5.25" 50 capacity	£6.25
5.25" 100 capacity	£7.25
5.25" 140 capacity	£8.25

3.5" BOX AND DISKS OFFER (BENCHMARK)

20 3.5" DS/DD Disks plus 40 capacity box	£24.00
40 3.5" DS/DD Disks plus 40 capacity box	£38.00
50 3.5" DS/DD Disks plus 80 capacity box	£48.00

All boxes have lock and two keys

5.25" BOX AND DISKS OFFER (BENCHMARK)

25 5.25" DS 96 TPI Disks plus 100 capacity box	£16.00
50 5.25" DS 96 TPI Disks plus 100 capacity box	£24.00
100 5.25" DS 96 TPI Disks plus 100 capacity box	£40.00

All boxes have lock and two keys

MONITOR + KEYBOARD ARM

Supports up to 65lb. Supplied with desk, clamp and wall mounting.

Model No. ATM601	£95.00

SPACE SAVER PRINTER STAND

YU – S25A 80 Col	£25.00
YU – S25B 132 Col	£29.00

ALL PRICES INCLUDE VAT & P&P. UK & BFPO ORDERS ONLY

M
C
S

Cheques & Postal Orders to:-

24 Hour Orderline: 0597 87 784

Manor Court Supplies Ltd

Telephone: 0597 87 792
Fax No.: 0597 87 416

DEPT MU8, GLEN CELYN HOUSE, PENYBONT, LLANDRINDOD WELLS, POWYS, LD1 5SY

EDUCATION AND GOVERNMENT ORDERS WELCOME

Your technical questions answered by MIKE COOK

PROBLEM SOLVED

On the agenda...

- Connecting a TV to an Archimedes
- Too many upgrades for a BBC Micro
- Using a joystick instead of a mouse
- Networking a mixture of micros
- Preventing a micro from overheating
- Intermittent keyboard problem
- Compatible analogue and digital signals
- The meaning of *Index to burst*

Archimedes TV

I BELIEVE it is possible to connect the RGB colour monitor output from an Archimedes to a television or video with a Scart input. I can buy a Scart-to-BNC kit for around £20 so it must be possible to make the connection via a BNC socket at a moderate cost. Is this possible and, if so, do you have the information on how to do it? – **J. Tierney, Macclesfield, Cheshire.**

● *A Scart-to-BNC connector will only transfer the composite signal of the Scart standard. As the Archimedes does not put anything on the appropriate pin you will be wasting your time.*

A monochrome output from the Archimedes can be connected to a video input socket – usually BNC – of a video recorder, but there is no colour, so you can only use your video if it has an RGB input.

Spurious characters

I HAVE had an Issue 4 BBC Micro for about five years, and during this time I have made many upgrades, the latest being a double density DFS. Before this I occasionally noticed odd characters appearing at random on the screen on power up, but they did not cause any problem.

Now many more characters appear, still at random, and they seem to die out after a short time. What is really worrying, however, is that software is beginning to crash.

After a few minutes everything seems to work perfectly and if I switch off and then on there is still no problem. The micro has to be left off for a long time before the problem recurs. Is this something to do with warming up and can anything be done about it? – **C. Betterton, Dunstable.**

● *It very much sounds like a warming up problem. The response time of digital circuits depends on temperature. It seems that your micro is just on the edge of working, and the changes that occur when cold are just sufficent to push it over the edge.*

Spurious characters on a Mode 7 screen or random short dotted lines on other modes indicate that an incorrect value is being placed in the micro's memory. On power up it first places the number corresponding to a blank all over the screen and this is not happening correctly.

It could be due to many things, the most likely being that with all the upgrades you've added the drive capability of the micro's data bus has been exceeded. If this is the case you will need to replace the bus driver – IC14 – with a 74ALS245 device.

The ALS has a greater driving capacity than the existing LS. If the original is soldered in place cut the chip out carefully using sharp side cutters and then unsolder the pins one at a time, clearing the holes with a solder pump. Fit a socket before the replacement chip.

Alternatively it could be an age problem. As chips deteriorate they can exhibit this sort of behaviour, caused by the ingression of moisture between pins and IC body. The heat of operation drives out the moisture and temporarily returns the chip to full specification.

Having said this, the culprit could be almost anything attached to the data bus or involved with the address decoding. Chips I have seen which cause problems on other machines are IC71 and 72 and the memory chips IC 53 to 64. One way of testing chips behaving like this is to get a can of Freeze-it – not very ozone friendly I'm afraid – and cool the suspect IC to see if you can get a recurrence of your problem.

Linking micros

I HAVE just finished writing a suite of bulletin board programs and a friend who is using it has asked me if I can convert it to a multi-user system. My problem is how to link a mixture of Masters and BBC Bs.

I want to use one micro with its own disc drive for each line and link them to a Master with a hard disc to act as a file server passing messages between the slave computers. Can I just wire up the user ports, and if I do this, how can I identify which computer is sending data? – **Keith Anderson, Stockport.**

● *If you wire up all the data lines from the user ports together you will have to make sure that there is only one "talker" activated on the system at any one time.*

In this case you will have to devise a protocol

Turn to Page 62 ▶

◀ *From Page 61*

for the communications – not a very easy task.

Perhaps the best way to proceed would be to implement a slight variant on the IEEE protocol with the user port and the printer port. However I stress that it is not a trivial task.

The simplest alternative would be to use Econet to connect your machines, as this is fast enough for your application and the hardware and software is available and proven.

Mouse replacement

IS it possible to use a Quickshot joystick in place of the mouse on an Archimedes? – **M. J. Abrams, Harpenden.**

● *Not very easily, because the mouse produces both a direction signal and a movement pulse for horizontal or vertical movement, but the joystick will only produce a movement signal. You would have to generate a pulse train from a direction signal and, while this could be done, you have to consider the way such a system would behave.*

Movement would only be at one speed, and to allow fine control this would have to be slow. Also you would not get the same feel as a mouse when it comes to drawing. So while it is possible I think the results would not justify the effort. However if there is a large demand I will consider it, so if any readers are interested please write and let me know.

> ‘Index to burst is just pseudo technical gobbledygook and means absolutely nothing’

RGB signals

I HAVE a BBC B which I use with a TV with an RGB input. As I understand it, the BBC Micro uses digital RGB signals, so will the same TV work with an Archimedes which has an analogue RGB output? – **Anthony J. Sharkey, Fulham, London.**

● *A TV set that is described as having an RGB input will have an analogue RGB input, the brightness of each colour gun being proportional to the voltage being fed to it. A digital RGB output means that each signal is either on or off, therefore each colour gun will be on or off. So you can use an analogue RGB monitor with a digital RGB micro as well as those with analogue signals.*

Hot micro

MY BBC Micro suffers from an overheating problem: With the cover on, the machine works for 30 minutes and then hangs up. This problem only occurs when a shadow ram board is attached, and I have tried two different makes of board with the same result.

I have noticed that IC6 gets very hot whenever a board is fitted. The machine works OK with the cover removed and a heat sink on this chip, but I'd like to cure the root cause of the problem rather than treat the symptoms. – **Brian Low, East Ham, London.**

● *The root cause, as you say, is the shadow ram board. Remove that and you remove your problem, but I suspect that is not a very satisfactory solution.*

I am not sure from your letter if you had to remove the heat sink from IC6 to get the boards to fit, but if you did you might have one of the original sorts of video ULA. These did tend to run too hot and needed a heat sink. If this is the case you could try replacing it with a more modern one that runs a lot cooler.

Alternatively your best solution could be to fit the fan described in the Body Building article on Page 25.

Technical terms

I OWN a 100k TEC 5.25in disc drive and when I sent it to be repaired the company failed it because of *Index to Burst*. Please could you tell me what this means and what should I do to repair it? – **Richard Eyer, Bristol.**

● *First of all you should get someone to look at it who is capable of telling you what is wrong. What you have been told is just pseudo-technical gobbledygook and means absolutely nothing.*

The drive produces an index signal once every revolution of the disc by shining an infra-red light through its index hole. If this strange report means that there is no index pulse it could because the LED has gone. It is a simple matter to replace it.

Faulty keys

I HAVE had my Archimedes 310 for about a year, and about four times the N key did not operate properly. Sometimes there's no response when the key is tapped, then two or three letters will be produced for each key press. Then the key will start to work normally for some months.

The first time this happened was on the day of purchase. My dealer sent the keyboard back to the supplier and after the so-called repair the micro worked fine. However, I have experienced the problem several times since and I am living in hopes that this might be a problem with the operating system that will be cured with the new Risc OS. – **G.E. Waits, Birmingham.**

● *As this problem occurs only with one key it must be a hardware fault. The most likely cause is a microscopic crack in the printed circuit track that feeds the key.*

Normally this is making contact, but occasionally it may lift due to stressing or thermal expansion. You can replace the tracks with ordinary wires running over the back of the board.

The second most likely cause is the key itself. Due to its construction it could be sticking, and it is not unlikely that it could produce the symptoms you describe. If so this would entail a replacement key switch.

PINEAPPLE SOFTWARE

PCB DESIGNER

PCB is a powerful Rom based printed circuit board design program suitable for all BBC computers. Its fast high density 1:1 scale print routine allows prototype boards to be made directly from a printout, and a 2:1 scale print may also be used to produce professional quality boards. A second eprom is optionally available to add a powerful auto-track routing facility to the program. This utilises a 'rats-nest' input routine and allows any component to be 'picked up' and moved around the board without having to respecify component interconnections. The full auto-route facilities are available even on a standard unexpanded model 'B'.

'PCB auto-route is remarkable. No similar software comes near the price.'–ACORN USER, Aug. '88.

'Although it appears expensive, there is nothing else remotely similar, even on other micros for less.'–BEEBUG, April '88.

PCB Manual Track Routing	£85.00
PCB Auto-routing	£185.00
PCB Plotter Driver	£35.00

P&P Free

IBM PCB DESIGNERS

EASY-PC EASY-PC is a powerful PCB design program combined with a schematic drawing package. Up to 8 board layers plus upper and lower silk screens. Board size up to 17"x17". Powerful zoom and pan features. Suitable for IBM PC/XT/AT & compatibles with 512k Ram.

EASY-PC	£270.00

P&P Free

PCB TURBO V2 Unbeatable full feature auto-routing IBM PCB designer. Boards up to 32" x 32" with 6 layers. Output to pen plotter, photoplotter, dot-matrix printer or laser printer. Minimum requirements: IBM XT/AT compatible (286 or 386 processor) with 640k Ram and 10mb hard disc. CGA, EGA or VGA colour graphics adapter.

PCB TURBO V2	£695.00

P&P Free

ROLAND PLOTTERS

New 1000 series plotters at unbeatable prices! All with A3 paper handling 8 pens and 420mm/sec plotting speed. Parallel and serial interfaces and soft pen landing with automatic origin setting on all models. 1200 model has addition of electrostatic paper hold and X-Y coordinate display. 1300 model also has manual pen speed adjustment and a 1Mb buffer.

DXY 880A	£540.00
DXY 1100	£625.00
DXY 1200	£865.00
DXY 1300	£1025.00

P&P £10.00

Please add 15% VAT to all prices

HOME ACCOUNTS

A brand new program from Pineapple offering the simplest solution to keeping track of all your home accounts. The program is unbelievably simple to use but still offers all the essential features such as automatic standing order handling, statement reconciliation etc. Any number of accounts may be stored on disc and transfers between accounts requires only a single operation. Available for Model 'B', Master and Compact with disc drive.

Home Accounts	£19.95	P&P Free

DIAGRAM II

Still the only BBC drawing package to allow really large diagrams (up to 30 mode 0 screens DFS, 80 mode 0 screens ADFS) to be created. The unique scrolling and indexing system allows easy access to any part of the diagram, and the rapid line drawing routines enable diagrams to be produced very rapidly. The print routines provide unequalled flexibility with infinitely variable H & V scales and 90 deg. rotation if required. The smallest scale allows up to 18 mode 0 screens to be printed on an A4 sheet with clearly readable text, and full use can be made of wide carriage printers.

'The quality of printing is the last factor which makes Diagram II so outstanding. The package really is capable of producing top quality diagrams.'–ETI, March '88

Diagram II	£55.00	P&P Free

ADFS Utilities Rom

ADU is an invaluable utility for all ADFS users. It adds over 22 new *commands to the ADFS filing system as well as providing an extensive Menu facility with over 35 sub commands covering areas such as repeated disc compaction, saving and loading Rom images, auto booting of files and many more. Transferring of files from DFS to ADFS is also made very easy with *DFSADFS.

ADU	£29.00	P&P Free

MARCONI TRACKERBALLS

We now have an adapter available to link the trackerball to the Archimedes, to enable it to directly replace the Archimedes mouse.

Bare Trackerball (no software)	£45.00	For Model 'B' and 'B+' (with Icon Artmaster)	£59.00
For Master 128 (with Pointer Rom)	£59.00	Pointer Rom for Master 128	£12.50
Adapters to drive BBC Mouse software	£8.00	Archimedes Adapter	£19.95

Trackerballs also available for other computers, please 'phone for details P&P on Trackerballs £1.75

MITEYSPICE, SPICE.AGE and ECA-2

Three very powerful circuit analysis packages. Miteyspice is available for the BBC range of computers, and Spice.Age and ECA-2 for the IBM and compatibles. Spice.Age is a new product for the IBM range which provides facilities for transient and Fourier analysis as well as D.C. and Freq. response performance.

Miteyspice (for BBC and Archimedes)	£119.00	Spice.Age (IBM PC/XT/AT 512k Ram)	from £70.00
ECA-2 (IBM PC/XT/AT 256k Ram)	£675.00	LCA-1 (Logic Analyser for IBM's)	£350.00

P&P Free

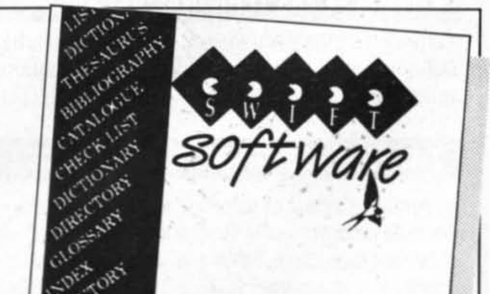
Please address all enquiries to:
PINEAPPLE SOFTWARE
Dept. MU, 39 Brownlee Gardens, Seven Kings, Ilford, Essex IG3 9NL. Tel: 01-599 1476

VISA

Access

NEW! for the BBC Micro, Electron & Archimedes

KEYWORD



The dynamic word finder for home and business use

Now you need never be stuck for a word again because Keyword contains dozens of synonyms for over 10,000 words.

And it's so easy to use. Just type in a word and straight away you'll be offered a huge list of alternatives. Then simply select the word that's nearest to your liking.

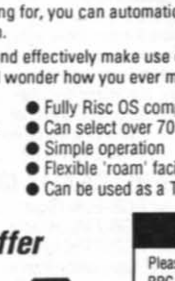
Or if it's not exactly the one you're looking for, you can automatically select another, more closely, related set of words – and so on.

With Keyword you'll be able to quickly and effectively make use of the wealth of the English language, and once you've used it you'll wonder how you ever managed without it.

- Easy to use
- Over 10,000 synonyms and antonyms
- Nearly 1,000 main subject headings
- Extra rapid word search
- Works with Arthur 1.2
- Fully Risc OS compatible
- Can select over 70 words at a time
- Simple operation
- Flexible 'roam' facility
- Can be used as a Thesaurus

Special Introductory Offer SAVE £4.95

We will send one of these superb calculator watches, worth £4.95, to the sender of every order for Keyword we receive before 31st July, 1989



In case of high demand we reserve the right to replace this watch with one of equal or better value

ORDER FORM

Please send me Keyword for the following:

BBC Micro 5.25" 80T DFS	£19.95	☐
BBC/Electron 3.5" ADFS	£19.95	☐
Archimedes	£29.95	☐

I enclose a cheque/Euro cheque/PO made payable to SWIFT SOFTWARE.

Name ....

Address ....

....

Post Code .... Tel: ....

Swift Software, MU8,
347 London Road,
Hazel Grove,
Stockport,
SK7 6AA.
Tel: 061-456 0926

Z88 AND PSION ORGANISER

from

TK COMPUTERWARE

The mail order specialists

Z88

Z88 COMPUTER	£227	CENTRONICS I/F	£29
CARRY CASE	£10	MAINS ADAPTOR	£10
BBC LINK	£25	128K EPROM PACK	£50
32K RAM PACK	£20	Z88 COMPUTING	£10
128K RAM PACK	£50	USING YOUR Z88 BK	£10
512K RAM PACK	£200	SPELLMASTER	£59

WORDMONGERS SOFTWARE

ZBASE Z-88 → OFFBASE DATABASE FOR Z88

Designed for both first time users and experienced dBase programmers, zBase, with its Front End provides full relational database facilities on the Z88. **£69**

"zBase does indeed provide a passable near dBase environment on a portable computer..."

U.K. dBase User Group News

Z-TERM → Z88 TERMINAL PACKAGE

Scrolling and Viewdata modes. Compatible with Hayes, Miracle and dumb modems. Autodial with programmable function keys. **£52.50**

Z-TAPE → Z88 CASSETTE INTERFACE

Integrated package of software and cabling to use cassette recorder as file storage for the Z88. Includes catalogue tape, Save, Fetch and Verify. Also option to run machine program from RAM. Z-Tape menu follows the pattern of []F, Filer. **£52.50**

PSION ORGANISER

ORGANISER XP2	£139	SPREADSHEET	£40
COMMS LINK	£60	SPELL CHECKER	£30
32K DATAPACK	£35	DATA ORGANISER	£35
64K DATAPACK	£60	FINGER ORGANISER	£35
128K DATAPACK	£100	ORGANISER BOOK	£10
32K DRAM	£55	PSION PRINTER	£195

for further details contact:-

TK Computerware, Stone Street, North Stanford,
Ashford, Kent, TN25 6DF
Tel: 0303 812801 • Int: 010 44303 812801
Fax: 0303 812892 • Telex: 96676 PMFAB G
All prices include U.K. mainland delivery

CARE ELECTRONICS

800 St. Albans Road, Garston, Watford,
Herts. WD2 6NL. Tel: 0923 672102

For your convenience first price Ex VAT, Second Inc VAT

CARE MASTER SMART CARTRIDGE

At the press of a button halt any program running and execute any one of a host of useful built in, or user defined functions and once completed will return to the program and continue. Built in functions include:- Tape to Disc, Screen Dump to Disc or Printer, Sound On/Off, Autosave and much more £30.00 £34.50c

CARE MASTER ROM CARTRIDGES

Designed by Care Electronics to Acorn specifications to enable the use of 2nd generation ROM. i.e. Interword/Spellmaster etc.

The Care Master cartridges offer 5 options for maximum user flexibility.

1. Dual cartridge takes 2 Rom	£9.00	£10.35c
2. Single Zif takes 2 Rom	£14.00	£16.10c
3. Dual Zif takes 2 Rom	£18.00	£20.70c
4. 32k Switchboard Cartridge for 32K Roms	£12.00	£13.80c
5. Quad Cartridge takes 4 Rom and enables by switching the use of any 2 roms inc Inter Series rom	£12.00	£13.80c
Master Rom Extender for using BBC B Cartridges on the Master–Ideal for schools	£12.00	£13.80c
Morley AA (Internal) Rom Board	£40.00	£46.00d

BBC B ROM CARTRIDGE SYSTEM

BBC B Low Profile Rom System	£13.00	£14.95c
BBC B Spare Cartridges	£3.00	£3.45c
BBC B Cartridge Storage Rack	£1.20	£1.38c

BBC B Cartridges can be used on the Master with the Master Rom Extender–See above

EPROM PROGRAMMER V2

Programs 8K, 16K, 32K CMOS or NMOS devices voltage selectable 21V or 12.5V. Complete with comprehensive software which includes Rom management system, plugs into the user port	£30.00	£34.50d
Eprom Programmer Utilities Disc	£6.00	£6.90c

SPECIAL OFFER

MORLEY TELETEXT ADAPTOR

Comes complete with 16K ATS Rom, Manual and utilities Disc at the unbeatable price of £86.00 £98.90b

LABELMASTER

INCLUDES MAILING LIST FACILITY

Uses a variety of print styles and sizes. All formatting is done for you and can accept different label sizes. A comprehensive label printing program that is easy to use for BBC B, Master, Compact and Electron–Please state model when ordering

BBC B and Master Version	£15.00	£17.25c
Archimedes Version	£16.00	£18.40c
Compact and Electron Version	£16.00	£18.40c

CARE PRINTER BUFFER

User definable for BBC B, Master on Rom or Disc . £13.00 £14.95c

PRINTER SWITCHERS

Two computers to one printer or vice versa	£25.00	£28.75b
Three computers to one printer or vice versa	£33.00	£37.95b
Four computers to one printer or vice versa	£40.00	£46.00b

Please note that the above units switch all lines, are suitable for all types of printers and computers using Centronics Parallel and INCLUDE LEAD

Six computers to one printer	£60.00	£69.00b
Four to one automatic switcher	£102.00	£117.30b
Eight to one automatic switcher	£128.00	£147.20b

For advice or a quote on your installation please phone

User port switcher 2 to 1 & off £25.00 £28.75d

CARE READY MADE LEADS RANGE

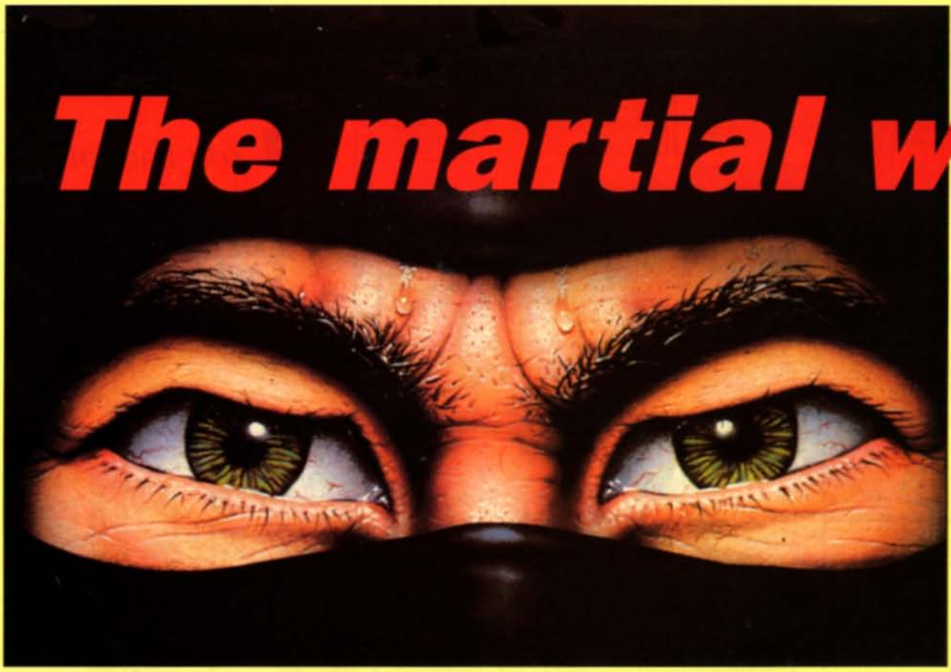
BBC/Master RGB-Euro (Scart)	£9.00	£10.35c
BBC/Master RGB-7 Pin Hitachi	£7.00	£8.20c
BBC/Master RGB-7 Pin Ferguson	£7.00	£8.20c
Centronics to Centronics Printer	£11.00	£12.65c
User Port Extension lead 0.5M	£9.00	£10.35c
1MHz Bus Extension lead 0.3M	£10.40	£11.96c

Wide range of leads in stock–please phone

Government & Educational orders welcome. How to Order: Enclose your cheque or P/Order made payable to CARE ELECTRONICS. Access or Visa cards welcome Please allow 7 days for delivery. Please add Post & Packing – a=£11.50; b=£3.45; c=£1.38; d=£2.30

We will be closed for the month of August 1989

The martial way



The first in a series to help you complete The Last Ninja

THE secrets of Ninjitsu had been jealously guarded for centuries and only once every decade were the scrolls seen at the ritual of the White Ninja. None coveted these secrets more than the evil Shogun. Seizing the opportunity of the ritual he sprang a fiendish trap that destroyed the brotherhood, except for one – you, the last Ninja.

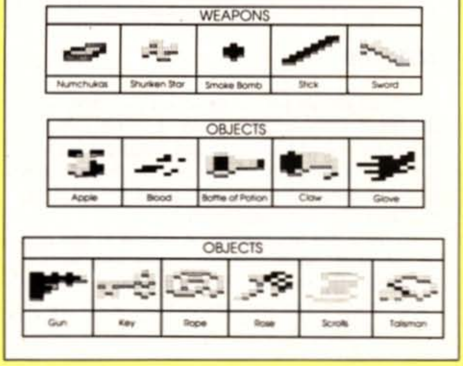
Your sworn oath is to recover the scrolls so you travel to the mystical lands of the Shogun. Already his guards are mastering the ways of the Ninjitsu.

To reach the Shogun's Palace you must use all your weapon craft and fighting skills as you travel through dangerous wastelands and magnificent gardens then descend into the direst dungeons before the final confrontation.

You cannot fail because you are the Last Ninja. Now, in three parts, *The Micro User* will be help-

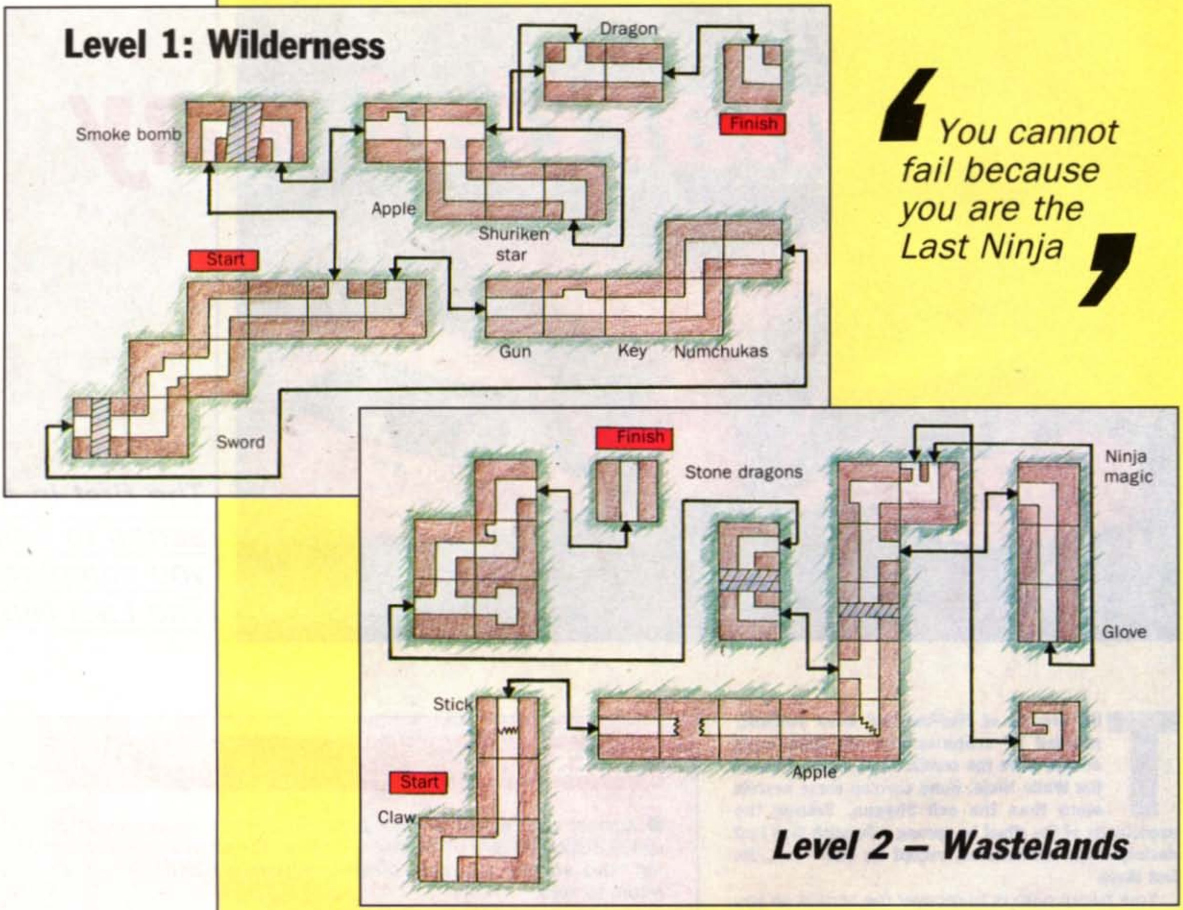
Turn to Page 66 ▶

WEAPONS AND OBJECTS



CLUES

- ● Against the fastest and toughest opponents, TUSJLF PODF PS UXJDF BOW UIFO SVO UP BOPUIFS TDSFFO. The other screens should not have another opponent present, otherwise FOFNZ XPVOET will return to zero.
- ● There's no smoke without fire: Find where the fire comes from and hit it FYBDUMZ CFUXFFO UIF FZFT with a TNPLF CPNC.
- ● Take your time when jumping over SJWFST PS TXBNQT. For future reference, mark your positions against some yardstick on the screen before leaping.
- ● DMBX your way up – and down.
- ● Conserve your TNPLF CPNCT and TIVSJLFO TUBST. After you have used the last one, if you try to throw another they will disappear, never to return.
- ● When nearing the end of your tether the LFZ opens a door to your success.
- ● The HVO can rid you of an impassable arachnid.
- ● A HMPWF may help green fingers to pick.
- ● The TUJDL is the most powerful weapon of all.
- ● Remember, with the UBMJTNBO, to give is better than to receive.
- ● A pot awaits the SPTF and then *open seasame*.
- ● Up, up the SPQF and away to escape the lowest level.
- ● A CPUUMF PG QPUJPO to put a demented opponent to sleep.
- ● The TDSPMMT once found will complete your quest.



Level 1: Wilderness

Dragon
Finish
Smoke bomb
Apple
Shuriken star
Start
Gun
Key
Numchukas
Sword

Level 2 – Wastelands

Finish
Stone dragons
Ninja magic
Glove
Stick
Apple
Start
Claw

> *You cannot fail because you are the Last Ninja*

◀ ***From Page 65***

ing you in your quest. We start, this month, by giving you some coded clues together with maps and the complete solution for the first two levels.

Over the next two months we'll publish the maps and solutions to the rest of the levels to enable you to complete your mission successfully.

● *If you don't already have a copy of The Last Ninja, see the offer on Page 118.*

ENEMY
WOUNDS
USING
HOLDING
POWER
THE LAST NINJA

Putting the boot in seems par for the course

THE SOLUTION – Part I

LEVEL ONE

The apple gives you an extra life, the other objects come in handy later on. The round yellow/red weapons are smoke bombs which you use to kill the dragon at the end of the level.

Stand a good distance away – as far left off the path as you can go – so the bombs explode inbetween the dragon's eyes. This kills it and allows you to pass, otherwise you fry.

LEVEL TWO

The claw allows you to climb up the rocky wall on the fourth screen: Hold it – no weapon selected – and walk into the smallest part of the wall to the right of the centre. Repeat this to climb down later on. You can't get back up or down from this part.

To pass the fire breathing statue at the end of the level walk into the rocky wall with a flashing star in it and crouch. You'll start to flash, and as long as you don't die, you'll be let past the statues.

THE PERFECT PAIR

The best-selling, award-winning BBC software is now joined by THE definitive guide

A Dabhand Guide
BRUCE SMITH
ROBIN BURTON
Mini Office II
BBC B B+ Master Series version
DABS PRESS
mini OFFICE II
DATABASE SOFTWARE

The Program

Mini Office II is the highly-acclaimed suite of integrated programs which turns your computer into a versatile business machine.

It's the perfect package to increase your personal productivity – with more than 400,000 satisfied users across the complete Mini Office range.

The Book

The Dabhand Guide to Mini Office II is a brand new book to help you get the most out of the software. It not only contains the facts, but also the kinds of hints and tips that can only be built up through years of computer use.

More than a manual, the guide assumes nothing. Beginning with the first sentences typed into the editor, you are led through all aspects of using the system, up to the most advanced techniques.

All the examples are also on an accompanying disc which even includes a very useful routine to print out large spreadsheets sideways.

What's more, when you buy Mini Office II and the book together we'll knock £5 off the combined price!

Please turn to the order form on Page 119

BBC version

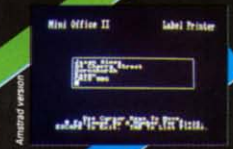
WORD PROCESSOR: Compose a letter, set the printout options using embedded commands or menus and use the mail merge facility to produce personalised circulars.

C64 version

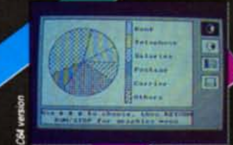
DATABASE: Build a versatile card index, do powerful multi-field sorting, use the flexible printout routine, perform all arithmetic functions and link with the word processor.

Amstrad version

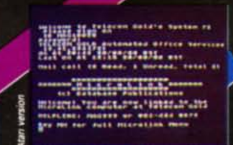
SPREADSHEET: Prepare budgets and tables, total columns and rows with ease, copy formulae absolutely or relatively, and recalculate automatically.


Mini Office II
Label Printer
Amstrad version

LABEL PRINTER: Design the layout of a label, select any label size and sheet format, read in files from the database module and print out in any quantity.


C64 version

GRAPHICS: Produce pie charts, overlay line graphs and display bar charts side by side or stacked. Enter data directly or load data from the spreadsheet.

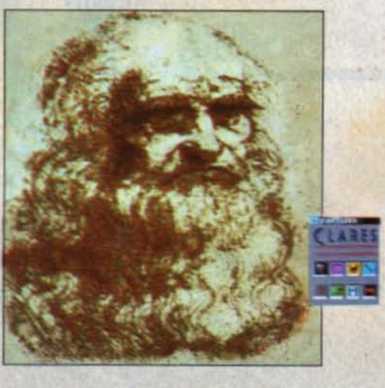

Atari version

COMMUNICATIONS: Access services such as MicroLink and Telecom Gold, send electronic mail, telex, fax and tele-messages in a flash or order a wide range of goods.

WHO BETTER TO DEMONSTRATE THE PERFECT PAINTER

Leonardo Da Vinci, hailed as the perfect painter. Creating priceless masterpieces with oil, canvas, pen and ink that are marvelled at in galleries world wide.

Leonardo Da Vinci (1452 – 1519)

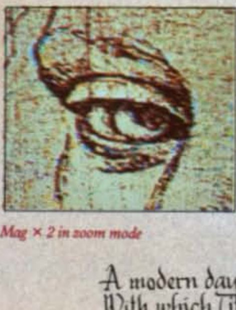


Self Portrait c.1513 drawn in Pro-Artisan c.1989

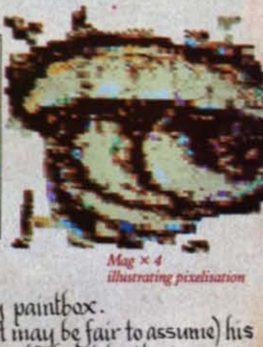
What marvels then, could he have created with modern tools within his grasp?

Like Pro-Artisan from Clares. A computer graphics and image manipulation package which, combined with the Archimedes, produces breathtaking graphics. Bending, shaping, colouring and toning to your every whim.

Eye Detail



Mag × 2 in zoom mode



Mag × 4 illustrating pixelisation

A modern day paintbox.

With which (it may be fair to assume) his self portrait may have looked like the image above, and with Pro-Artisan's zoom facility, he could have created even greater detail.

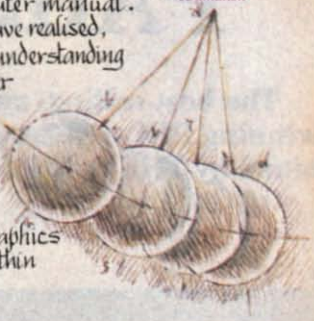
Da Vinci was indeed a genius.

Ahead of his time. A latterday Einstein. Creating wild and wonderful inventions like machines that fly, elaborate ships and submarines.

Light and shadow theory c.1492

Even more mind boggling is his analysis of optical principles. Ray tracing, for example, his understanding of shadow and light (the effect of light moving three dimensional objects) reads like a computer manual.

Detail of Delta Animation



He will not have realised, but he had all the understanding of modern computer graphics, without the technology to put it into practice — what frustration.

Today, such graphics manipulation is within everyone's grasp.

Newton's cradle

Screen detail of Render Bender

With Render Bender from Clares which, using ray tracing, allows the production of 3D scenes and objects. And then allows them to be animated, every shadow and reflection is perfectly calculated, appearing as it would in real life.

A computer generated movie, inside your own machine. Even better, your own soundtrack can be added.

What's more, interaction is now possible between Pro-Artisan, Render Bender and Armadeus.

A superb package, but spare a thought for poor Leonardo, if only he had then, what we have now.

RISC OS COMPATIBLE

PRO-ARTISAN

Pro-Artisan – £169.95 inc. vat.

CLARES
MICRO SUPPLIES

98 Middlewich Road, Rudheath, Northwich, CHESHIRE CW9 7DA.
Telephone: 0606 48511 Fax No: 0606 48512

RENDER BENDER

Render Bender – £79.95 inc. vat.

U·P·D·A·T·E

Girls master computer designing

A NEW craft design and technology building equipped with the latest and most powerful range of computers from Acorn was opened recently at Camden School for Girls. Part of a £200,000 redevelopment scheme at the 700 pupil school, it was officially launched by Neil Fletcher, Leader of Inner London Education Authority.

A total of 12 Archimedes computers and four Master 128 machines at the school will be used for the craft design and technology classes as well as Technical Vocational and Educational Initiative development work. A collaborative project has been arranged between Acorn and the Camden Consortium of the TVEI to investigate the teaching of CDT.

"We can now boast the most advanced CDT facilities in the London area", said headteacher Geoffrey Fallows. "The Acorn computers open up exciting new opportunities for teachers and students in CDT and art and textiles".

The opening is good news for the first 34 girls at the schools who chose CDT as a GCSE option this year and who have been travelling to nearby Haverstock School for their practical work. The project has been set up by Jack Haslam, TVEI advisor and CDT coordinator for three local schools, including Camden School for Girls.

Technology goes on tour

HI-TECH on wheels has been helped by a recent donation from Citizen Europe (0895 72621). The printer company has donated eight Citizen 120D 9 pin dot matrix printers and an HQP 40 colour 24 pin machine to a specially equipped hi-tech coach for use by Humberside schools.

Fitted with BBC Micros, the £65,000 coach will visit secondary schools in Humberside, giving pupils a broad range of experience in technological applications and will provide a much needed resource for the in-house training of teachers.

Schools will be able to choose from a range of specially designed technological application modules, including electronics, pneumatics, computer control, computer aided design and computer aided manufacturing while being supervised by a fully qualified advisory teacher who will also double as coach driver.

The project is the result of a combined effort from Humberside County Council's Education Department, the DTI, BP Chemicals, British Aerospace and Yorkshire Electricity.

Neil Fletcher at the opening of the Camden School for Girls Craft Design and Technology building

Numerator for the Archimedes

A NEW version of popular maths learning program Numerator is now available for the Archimedes. Logotron (0223 323656) is billing its latest product as the first major educational package to run under both existing operating systems and the new Risc OS.

The package, launched late last year, has already been well received by education authorities, with Dorset and Cambridgeshire LEAs having set up Numerator-based projects in their secondary schools. The Times Educational Supplement described the program as "a product of quality with considerable educational potential".

The latest version is faster, contains bigger, clearer onscreen models and has colour printer drivers. It contains new facilities including the ability to examine modules and other built-in processes which take advantage of the Archimedes' increased memory capacity.

The new version costs £69 and a site licence costs £250 with quantity discounts available.

New catalogue

THE Vikings, castles, heraldry, railways and the sea are just a taste of the wide range of educational programs for BBC Micros included in a new free catalogue for teachers and parents. It has been compiled by specialists in the education field Fernleaf Educational Software (0474 359037) and also includes details of support resources for the programs.

Practising punctuation

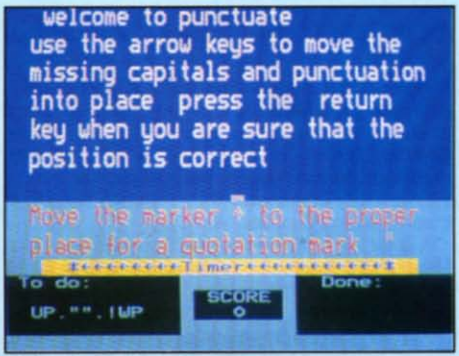
Mike Bibby learns when to come to a full stop

Product: Punctuate!
Price: £16.95
Supplier: Topologika, PO Box 39, Stilton, Peterborough PE7 3RL
Tel: 0733 244682

WHEN I was a plain, old-fashioned writer I thought editors were odd beasts. Naturally it wasn't until I became an editor that I realised what strange creatures writers were: Change one punctuation mark, omit one unnecessary comma, swap a semicolon for a colon, question a question mark ... and all hell's let loose. Some people identify strongly with their punctuation marks, so attempting to teach correct punctuation can be a tricky business.

I was interested to see, therefore, whether the disc-based Punctuate!, from Topologika, could handle it more diplomatically than I had. Actually the program dodges the issue, as the teacher has to supply a correctly punctuated piece of copy in the first place. Punctuate! then presents it without full stops and the rest. Each pupil then has to add the marks in the correct places.

From the pupil's point of view you get up to seven lines of double height text – 35 characters to a line without punctuation. The idea is to use the cursor keys to move a missing mark – a dialogue box tells you which it is – to its correct location in the text. As soon as you touch an arrow key the mark appears at the bottom centre of the text screen. You steer it into position, then press Return.



```
welcome to punctuate
use the arrow keys to move the
missing capitals and punctuation
into place  press the  return
key when you are sure that the
position is correct

Move the marker " to the proper
place for a quotation mark  "
```

Using the Punctuate! program

this program could be one way of improving your punctuation

Up there... Quick — time's running out.
I wonder where this capital 'T' goes?

If you are right you get a nice beep and score points. If you've put wrong punctuation in the *right place* – where a mark is missing but not the one you're moving at the moment – you lose points. Pressing Return when the mark is over perfectly correct text has no effect.

The mark you're steering appears as a double height character on the text screen. It's actually in overwrite mode, so when you move it what's underneath gets obliterated. This has two drawbacks.

First, the mark being steered is in the same colours as the body of the text; you have to be careful not to lose it. And, more importantly, being in overwrite mode means that a space has to be left for punctuation marks – a dead giveaway.

I would have preferred the mark to move in insert mode, so the character it was threatening to overwrite was moved, creating some space.

You have to get the mark in position before time – shown as a decreasing line of arrows with accompanying beep – runs out. It's rather a friendly time limit as it doesn't start to tick away until you touch a key to position the mark, so it pays to plan ahead. You are helped by two boxes at the base of the screen: The first shows the marks you've still to place, while the second shows the ones you've done. Everything can be worked out in advance.

If you find a particular mark impossible to place you can give up by pressing Escape, though this costs you 20 per cent of your points. It's often cheaper just to get it right by trial and error, losing only a few points.

I never quite worked out the scoring, though I know you can get negative points although the display is zero. And the score displayed at the end of the game can differ from that shown during play because several screens – up to a maximum of 12 – can be linked in a story, working a page at a time.

The program doesn't know how many marks there are in total till the end. This tends not to matter unless you are being silly, and a higher score accurately reflects better play.

Depending on the teacher's whim, the program may be locked or unlocked. If the latter, you see a menu allowing you to choose any of the 15 different stories on disc. You can also change speed – four different rates and one untimed – and volume – three choices including silence. More importantly, this menu also allows you to choose what is tested for:

.,?!;:"

are all available, as are capital letters.

The student doesn't see this menu when the story is locked. The teacher can lock stories from a special teacher's menu, accessed by entering a code word at the pupil's menu. Not only does locking stories prevent students from choosing which passage to work on, it also sets things up for group work, prompting each child in sequence.

Assuming the story is locked, if its pages are linked, one pupil does all the pages, then the program prompts for the next student. If the pages aren't linked, all the pupils do page one before they all do page two and so on.

In addition to the pupil's menu options, the teacher's menu allows you to create, edit or delete a story. This is quite straightforward and well thought out, the only irritation being that the editor lacks word wrap – you have to pad out lines with spaces to avoid breaks in words. Otherwise it's trouble free and easy – not bad for such an important option.

It's from here that you link or unlink stories. You can also delete them and there's even a way to undelete mistakes. The teacher's menu also provides a way to change the access password and, last but not least, a full analysis of the last session. For each pupil it gives figures for the times a mark was offered, the number of successes and failures and how often Escape was used.

Only 30 pupils are catered for, but as Punctuate! will almost certainly be done as groupwork this is no problem in practice.

All in all, Punctuate! is a well designed and implemented package. It's very easy to use – there are even tutor pages on the disc for you to punctuate while you learn.

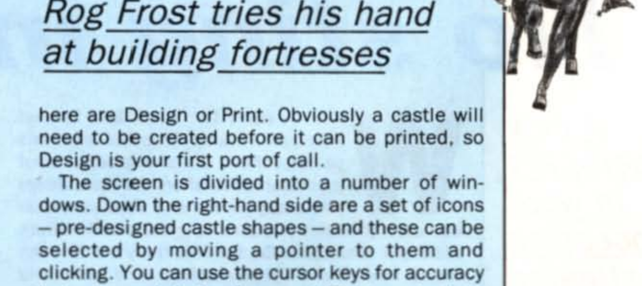
SUMMING UP

Punctuation is often a matter of personal style, and it would have been nice to allow alternatives. There's no constructive help with errors. You are told you're wrong – even if you've only run out of time – and allowed to attempt it later. You can also duck the issue with Escape. Without proper supervision, answering might degenerate into a trial and error process.

Of course the program doesn't teach punctuation, but that's not its aim. Its goal is the reinforcement and consolidation of punctuation skills – a goal it achieves admirably. Recommended.

Under siege

Rog Frost tries his hand at building fortresses



Product: Designer Castles
Price: £36.34 (5.25in disc) or £39.79 (3.5in disc)
Supplier: Data Design, Gowanbank, 3 Botham Hall Road, Longwood, Huddersfield HO2 4RJ.

IT is amazing how new ideas can still be thought of and implemented on the BBC Micro. Software writers seem to have a knack of always extending the potential of the machine, and that is certainly what has happened with Designer Castles. The idea is simple. You design elevations and plans of castles which are then printed out so that the sections can be cut out, decorated and stuck together to make a three dimensional model.

The software comes on either one 80 or two 40 track discs – the programs on the latter are split so that an absolute minimum of disc swapping is required. In addition to the disc, a 16k Printware support rom is essential and is provided. Data Design hopes that other software may make use of it before long. The Designer Castles Pack is completed by an A5 ring binder which contains 87 pages crammed with information.

Having installed the rom you first initialise the disc. This is an easy process since you just boot it – Shift+Break – and prompts will tell you to enter your name or that of your organisation. Type it in again to verify accuracy and then enter the serial number of the disc.

You are now advised to write protect it and every time you boot up from now on your title will appear on the classy opening screen. The options here are Design or Print. Obviously a castle will need to be created before it can be printed, so Design is your first port of call.

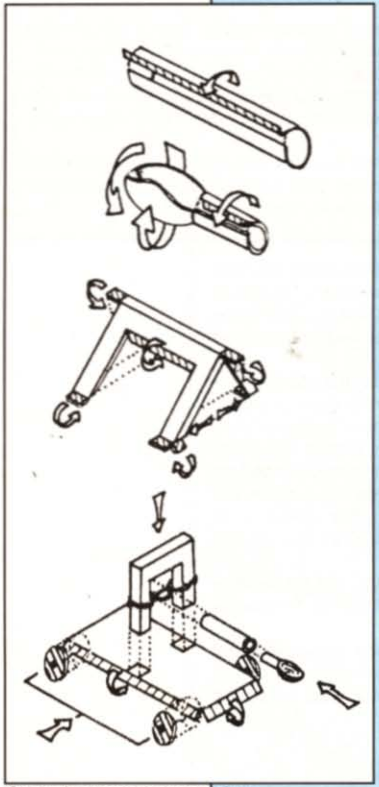
The screen is divided into a number of windows. Down the right-hand side are a set of icons – pre-designed castle shapes – and these can be selected by moving a pointer to them and clicking. You can use the cursor keys for accuracy but a mouse is better for speed. The icons include tall and short walls, round and square towers, gates and complete buildings. Chapels, cottages and weapons such as siege towers and catapults

Turn to Page 72 ▶

◀ From Page 71

are also available.

When an icon is selected it is taken to the elevation window at the bottom of the screen where the front view of a castle wall can be built up. This elevation can be taken to the main part of the screen where plans are put together from various views.


Catapult assembly instructions

I found the plans a bit fiddly to put together. All elevations arrive facing the same way and have to be turned as required, and this can cause problems because there may be insufficient room to put the wall where you want it. It is usually possible to overcome such a difficulty because the entire plan can be scrolled around the screen.

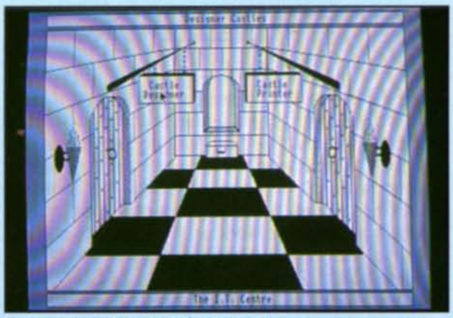
I also found it tricky to control the accuracy of the turning process and it was all too easy to get castles with corners that only roughly approximated a right angle – quite authentic, really.

When a castle is complete you can save and print it from the print option of the opening screen. The components can be output either small, medium or large. The manual gives advice on sizes, but be warned: Load a lot of paper into your Epson-compatible printer.

My first castle consisted of a square shape with a tower at each corner and an entrance on each side. This took 31 sheets and my system was tied up for about an hour. You are asked to enter a contact name while printing is in progress and this stays on screen the whole time.

The output comes complete with glue tabs and supports for straight walls, but it requires an awful lot of enthusiasm to cut, colour and stick the lot together. It would be more fitting to a whole class enterprise or a dedicated castle enthusiast. Much smaller and quicker prints can be obtained of each of the elevations used and of the entire plan. These are very useful aids to getting the entire three dimensional model correct.

An extra feature which many schools will find of real interest is that a castles database has been set up on the Campus 2000 system which is becoming increasingly common in secondary schools. Full instructions are given for sending your designs to the system manager so that they can be added and, of course, the method is given for downloading other designs.



Choose between design or print

I have some nagging doubts about this package. The time involved cutting and sticking would be difficult to justify as a vital part of a child's education. It seems to me to be far more useful as a design or technology program than for history, since the processes involved fit into that area of the school curriculum. It is also very useful for information technology with the ability to share designs with a wide and unknown audience.

Castle afficionados will, no doubt, love the program because such a huge variety of designs – imaginary or based on reality – is possible.

SUMMING UP

Although I have doubts about the value of some aspects of the work involved with Designer Castles, I have none about the planning and execution of the program or manual. Both are first rate pieces of work of the highest quality. I look forward to seeing more from Data Design in its Printware range.

No sting in the tail

A new experiment in word processing investigated by Len Nelson

WASP – short for Word And Symbol Processor – aptly describes what this package does. It's a disc-based word processor which offers the usual things you would expect of a word processor but also provides modern linguists and others additional characters. On the disc there's a file with French accents and German umlauts *a, n* and *u* with tilde plus Danish and Norwegian *o*. A further facility allows you to design your own – a useful feature if you are teaching other languages or even maths or physics.

Not only that, but Wasp is wysiwyg – your accents appear on screen as well as on the paper. To help you Wasp comes with a function key strip which shows how you get each additional character. Output is a standard font with bold, underlining and centering facilities supported – quite adequate for normal presentation of material.

The documentation is user friendly, so you

Product: Wasp
Price: £19.95
Supplier: National Extension College, 18 Brooklands Avenue, Cambridge CB2 2HN.
Tel: 0223 316644

Turn to Page 75 ▶

COLOURJET 132

HIGH PERFORMANCE COLOUR INK JET PRINTER

(compatible with IBM pc, BBC micro, Nimbus etc.)

- ★ PRINTS ALL 64 SCREEN COLOURS FROM CGA AND EGA USING OPTIONAL INTEGREX SOFTWARE
- ★ EMULATES OTHER PRINTERS (A1210, PJ1080A and QUADJET)
- ★ OVERHEAD TRANSPARENCY PRINTING
- ★ 80 + 132 COLUMN OPERATION, A4 WIDTH
- ★ UP TO 1280 DOTS/LINE ADDRESSABLE
- ★ FULL VIDEOTEX CAPABILITY
- ★ OPTIONAL BUFFERED RS232 (INTERNAL)
- ★ HIGHLY VERSATILE

SALES
BY DIVISION
CHEMICALS
TELECOMM
COLOURJET 132
FF
LF
ON LINE
ON LINE
ALARM
READY

ULTRA LOW NOISE

LIST PRICE £589 + VAT

EDUCATIONAL DISCOUNTS AVAILABLE

INTEGREX LTD CHURCH GRESLEY, BURTON ON TRENT
STAFFS DE11 9PT
Tel (0283) 215432
Telex 341727 INTEGX

HMSO
PUBLIC SECTOR CUSTOMERS:
FOR SPECIAL PRICING
CALL 0603 695051

Learning has never been such fun!
fun school 2
fun school 2
fun school 2
fun school 2

Fun School 2 for Over-8s contains:

- ***Build a Bridge:*** *Shape-fitting challenge*
- ***Passage of Guardians:*** *Enjoy anagrams*
- ***Unicorn:*** *First steps in problem solving*
- ***Logic Doors:*** *Mapping made easy*
- ***Souvenirs:*** *An introduction to travel*
- ***Code Boxes:*** *Discover binary arithmetic*
- ***Mystery machine:*** *Have fun breaking codes*
- ***Escape:*** *A final check on progress*

Fun School 2 for 6 to 8 year olds contains:

- **Number train:** Calculations made enjoyable
- **Shopping:** Which shops for which products?
- **Maths Maze:** Fun improving arithmetical skills
- **Treasure Hunt:** Introduction to coordinates
- **Bounce:** Get to grips with angles
- **Packing:** Discover tesselating shapes
- **Caterpillar:** Word building challenge
- **Number jump:** Have fun practising tables

Fun School 2 for Under-6s contains:

- ***Shape Snap:*** *Colourful shape recognition*
- ***Find the Mole:*** *Experiment with number sizes*
- ***Teddy Count:*** *Ideal introduction to numbers*
- ***Write a Letter:*** *Creative fun at the keyboard*
- ***Colour Train:*** *Play at spotting colours*
- ***Pick a Letter:*** *Word building made easy*
- ***Spell a Word:*** *Enjoy naming the pictures*
- ***Teddy Bears Picnic:*** *Move around a maze*

Now children can really have fun while learning. Fun School 2, designed by a team of educationalists, is available for three age groups: Under-6s, 6-8 year olds and Over-8s. Each pack comes with eight colourful and exciting programs, a colourful button badge and detailed instructions giving educational help.

The computer itself monitors the child's progress. The skill level – initially set by parents – is automatically adjusted to suit the child's ability.

Now children can enjoy using their parents' computer while they learn at their own pace.

Available for:
Spectrum, Commodore 64,
Amstrad CPC, BBC Micro/Electron
£9.95 (tape) £12.95 (disc).

Also: Atari ST, Amiga, PC £19.95
(PC version released in May)

DATABASE
EDUCATIONAL
SOFTWARE

Format	Under-6s		6-8 years		Over-8s	
	Tape	Disc	Tape	Disc	Tape	Disc
Spectrum	9094	9095	9096	9097	9098	9099
Commodore 64	9064	9065	9066	9067	9068	9069
Amstrad CPC	6179	6180	6181	6182	6183	6184
BBC Micro/Electron	2239		2242		2245	
BBC B+/Master 40T		2240		2243		2249
BBC B+/Master 80T		2241		2244		2250
Atari ST		9192		9193		9194
Amiga		9842		9843		9844
PC 5.25"		5764		5765		5766
PC 3.5"		5767		5768		5769

Please circle the code number of the format you require

Send to: Database Direct, FREEPOST,
Ellesmere Port, South Wirral L65 3EB.
Access/Visa orders: Tel: 051-357 2961

Please supply Fun School 2 for the code number(s) circled

☐ Cheque payable to Database Software

☐ Please debit my Access/Visa card no.

Expiry date ____/____

Signed ____________________

Add £2 per program Europe & Eire/£5 Overseas

Name ____________________

Address ____________________

Postcode ____________________

MU8

◄ From Page 72

don't need to be a genius to understand the package, and further help is given in the tutor file on the disc. It is no idle claim by National Extension College that the newcomer to Wasp will be able to get on with some competent word processing after working through it.

After setting up your printer and making a backup copy of the master disc, both of which are clearly described in the accompanying leaflet, CH."WASP" brings up a menu with the options: Make text, Edit text, Print, Quit, Alter width, Configure, Select Font and Design Font.

You do not need to learn a string of command codes before you can achieve anything worthwhile, since both on the initial menu and in the onscreen commands the meaning is clear and you need only to type the initial letter to select an option.

Those of a nervous disposition who have previous bad experiences of losing hours of work because they forgot to save or because there was a power cut due to little Johnny pulling the plug, can use Wasp without hesitation because it automatically saves as you work. At worst you will only lose the last screenful if the power lines come down.

An additional bonus, the result of the word processor's regular saving is that the length of your masterpiece is limited only by the amount of space left on your disc. A 40 track disc can hold more than 1200 lines or 20 pages of text, which should be plenty.

The only thing that you may find irksome is the system for moving text. Where you have to, save the bit you want to move and then insert it where needed. This is a minor quibble, particularly when not totally dissimilar methods are to be found on more sophisticated word processors.

SUMMING UP

Despite the definitely minor irritation in the method of moving text around, Wasp is a very useful product.

All washed up

Mike Bibby gets his feet wet

Product: The Water Game
Price: £13
Supplier: Centre for World Development, Regent's College, Inner Circle, Regent's Park, London NW1 4NS.
Tel: 01-487 7410

ONE of the cushiest jobs I ever had was taking water samples for the West Pennine Water Board. What a life – being chauffeured round the Pennines for a whole summer. However, The Water Game from the Centre for World Development isn't the least bit cushy. Aimed at the 8 to 13 age group, the simulation is designed to impress children with water's vital importance in our lives – and how much we tend to take it for granted.

The theme is simple, if implausible: A group of up to five children go to Country Cottage for a visit of three to eight days. Unfortunately the cottage isn't on the mains. Water has to come from two unreliable pumps, a lake that can run dry or a river that may be polluted. Not only do you need water to drink, wash and cook with, you also have livestock to cater for as well as crop irrigation.

The water for all this has to be carried in a bucket which, for most efficiency, you balance on your head. Unfortunately tree roots can trip you and there are muddy patches to negotiate as well as biting insects and rather nasty diseases.

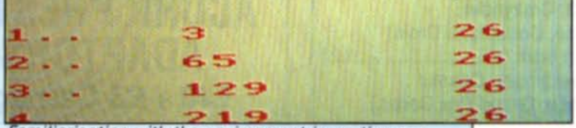
The program, which comes on disc, comprises three sections driven from a main menu that allows you to choose the length of stay, whether you have crops and so on, as well as allowing you to save, load and resume.

Section one familiarises you with the cottage's environment and the water requirements of yourself, crops and livestock. Initially you are presented with a snow-covered winter scene, then comes spring with a melt-water lake and finally the lake in summer – or rather the dry lake bed. The graphics aren't of the clearest, nor do they add much to the simulation – You're only there for a very short time.

Next you are shown a cross-section of four tanks, each at a different level and having an overflow to the – larger – one below. The first is inside the cottage, the rest outside. You have to pick a use for each, starting at the highest:

A: Animals
B: Drinking
C: Washing and cooking
D: Watering crops

The diagram itself isn't the clearest, and the design of the accompanying questions isn't too clever either. You're asked to choose a use for each tank in turn. If you get it wrong you are asked again, no matter how many mistakes you make and when you get to the fourth tank you've eliminated three of the options, so why ask?



```
              which  tank?

1,2,3  OR  4?

Tank       litres        hours
                          left
1..        3              26
2..        65             26
3..        129            26
4          219            26
```

Familiarisation with the environment in section one

This lack of rigour is also found in the next stage. Here you are asked to estimate the daily water consumption for the four uses. There is a

Turn to Page 76 ►

◀ From Page 76

range of acceptable answers, and if you are wrong three times you are given the answer.

Unfortunately the messages supplied are a bit silly. For personal use you need to drink between 1 and 2.5 litres a day. Enter 50 litres and you receive the advice *50 is rather a lot*. Enter .05 litres and you're told that *0.05 is rather low*.

Even when you get it right there are oddities. For washing and cooking you need between 10 and 50 litres a day. However any answer between these two figures is accepted as *about right* yet you can have at least one decimal place for precision.

Once you have got your rates worked out you are shown the consumption per day for each category. You have to carry every drop of it, so aim low. A diagram illustrates that the cleanest water must be in the house, and so on.

Section two is the simulation proper. Using the cursor keys you move a man-shaped sprite to various water sources, having chosen the weight of water you can carry. More than 25kg is kicked out without comment, choosing under 25kg made little difference in practice, though you are warned that 25kg may be too heavy.

Your water sources are unreliable. The pumps break and when spare parts are available *perhaps tomorrow* you have to sacrifice valuable gathering time while you effect the repair. On top of all this the lake can dry up.

You can also become diseased, fall into the river, get mired in mud or simply trip up, spilling everything. All in all it's not an easy life.

Unfortunately the implementation of this section is rather poor, both in the programming and design. Your sprite looks amateurish, deforming when it passes over the background. It's also clumsy: You sometimes get home before you physically reach there. You can sometimes plough through the mud while at other times you can't. The sprite occasionally flickers like mad or doesn't respond to a key press. It even disappears from time to time.

If the idea is to show children how repetitive and tedious water gathering is for a large part of the world the program succeeds magnificently. It was mind-numbing.

There are other problems with this section – sloppy layout, disappearing and inconsistent prompts and the like. Let's tactfully move on to section three.

This is the report stage and is rather better than what came before, giving its verdict on your group's performance. However, it still allows nonsense such as *carried 50 litres using a -7 litre jar* and *So carried most each day: 0 litres*. On the whole it's a good try but lacks finish.

SUMMING UP

It's a real pity that this program is so amateurish, because the aim is worthy. Unfortunately that isn't enough to make it worthwhile.

SUPER SUMMER SOFTWARE SALE

SUPERIOR TITLES (DISKS)

Fair Means or Foul	6.25
Exile	8.95
Repton thru Time	4.95
Life of Repton	4.95
Barbarian	6.25
Pipeline	6.25
Spellbinder	6.25
Quest	6.25
Elixir	6.25
Spycat	6.25
Play it Again Sam I (Citadel, Thrust, Ravenskull + Strykers Run)	6.25
Play it Again Sam II (Repton 3, Crazyrider, Gala Force, Codename Droid)	6.25
Play it Again Sam IV (Frak, Spellbinder, Cosmic Camouflage, Grand Prix Const.)	6.25

BUDGET DISKS

Footballer of the Year	2.50
Bugbyte Vol 1	2.50
Bugbyte Vol 2	2.50
Psychastria	2.50
Omega Orb	2.50
Round Heads	2.50

SPITFIRE 40

Flight Simulation disk 4.99

ACORN PRESTEL ADAPTORS

£40 + £3 Carriage

ASSORTED TITLES (TAPE)

War	2.50
Cosmic Battlezone	2.50
Krakout	2.99
Temple of Terror (Adventure)	1.99
Rebel Planet (Adventure)	1.99
Masters of Universe (Adventure)	1.99
Starseeker (Astronomy)	2.99
7 Game Compendium (incl. Flit)	2.50
BBC Bonanza (7 games)	2.50
Powerpack 1 (7 games)	2.50
Pedro	1.50
Cluedo	2.99
Spellbinder	3.95
Exile	6.50
Question of Sport	6.50
Pipeline	3.95
Elixir	3.95
Spycat	3.95
Bonecruncher	3.95
Genesis Project, International Sport	1.99

TOWERHILL

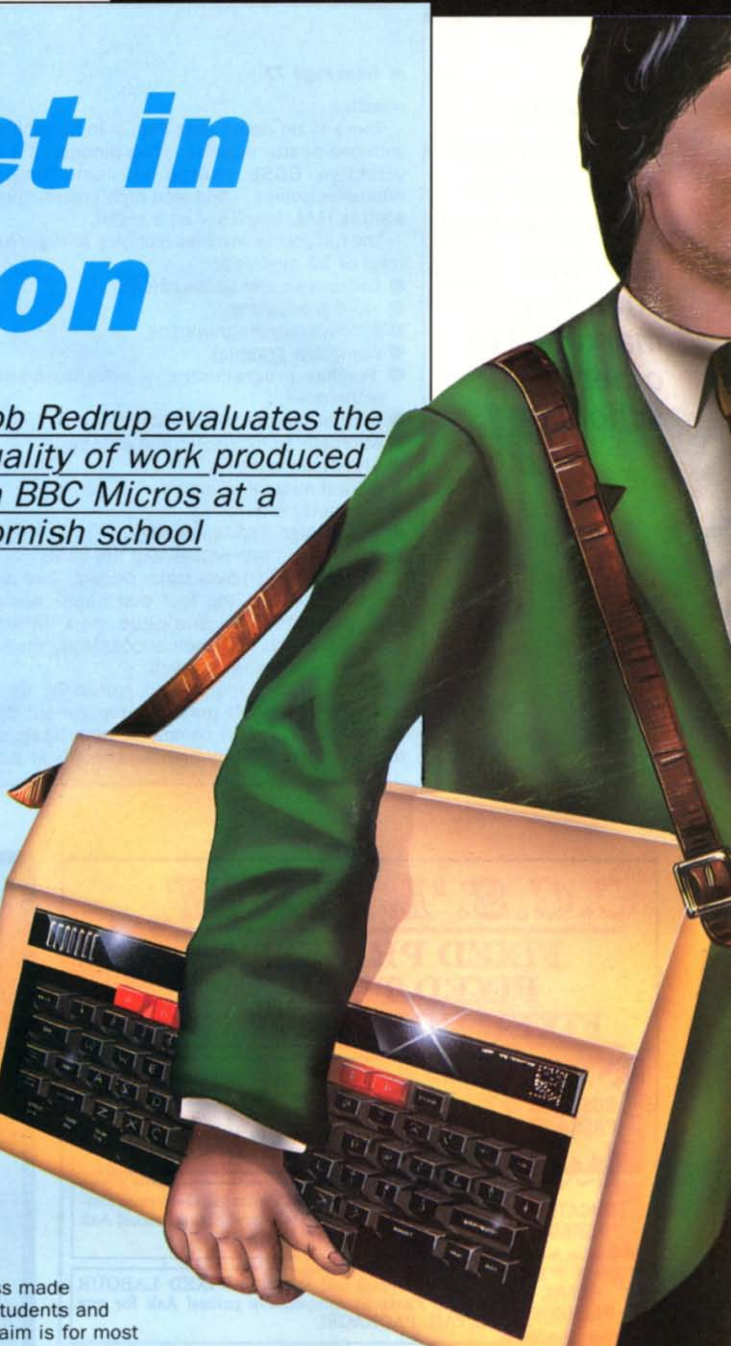
Unit 7, Acacia Close, Cherry Court Way Ind Est, Leighton Buzzard, Bedfordshire
Telephone: Leighton Buzzard (0525) 385329

ALL PRICES INCLUDE V.A.T. AND P&P. OVERSEAS ORDERS ADD £2.00

ABOVE OFFERS FINISH AUGUST 31st

Econet in action

Bob Redrup evaluates the quality of work produced on BBC Micros at a Cornish school



IT is 9.20 on a Tuesday morning, and students are moving to their classes at Pool School, near Redruth in West Cornwall. A number of pupils – including a high proportion of girls – enter the computer department. "All right, sir?" asks one, and receives a nod of the head. Others simply raise an eyebrow on seeing free places and, gaining permission, sit themselves at one of the 20 or so Econet workstations.

The school's BBC Micros are about to be put to full and constant use. Within seconds the pupils, in this case mostly fifth formers, are hard at work on a variety of tasks, confident, diligent and clearly enjoying themselves.

One girl is writing an essay using Edword, another is creating a simple data-handling program aided by the BBC Micro User Guide, to use at a coming school open evening. Others are preparing classwork of various kinds.

The policy at Pool School is straightforward. Bill Lamin, an ex-Marconi engineer and head of the department, puts it like this: "I want all pupils to be completely unafraid when confronted by a machine and an instruction booklet". If my observations are anything to go by, the policy is a total success.

At the heart of the Econet system is an SJ Research Fileserver, which Bill cannot praise too highly, both in terms of backup support and flexibility. I watched fascinated as he demonstrated this by changing the accessibility of certain programs while students continued working uninterrupted.

During two out of the five lunch breaks in a week, games programs are available. At other times, naturally, access to them is denied – but I was interested to see that very few pupils took advantage even when they could be used. The majority were using Edword to write essays, while others worked on Maths and French programs.

Edword has clearly proved a runaway success, thanks to the careful way it is introduced to pupils. Bill reckons to have them up and away very rapidly, as they become familiar with the processes used to create and manipulate text and produce a document that can be sent to the printer.

Another facet of this pupil-centred approach is demonstrated by the ease of access to the programs available on the network. Pupils are taught two main techniques: Press Shift/Break is the first, and if that fails then the BBC Micro is switched off for a few seconds and then on again. Apart from that, everything works from carefully devised menus and onscreen prompts and pupils rarely need to ask for advice.

Bill uses Milestone tests to assess the progress made by students and the aim is for most pupils to achieve a 70 per cent mark. They are checked on the use of a datafile on various flowers – interrogation and sorting in particular – and are asked to create a simple one themselves.

A football league and its points system is the excuse for creating a spreadsheet – and a histogram showing the results in bar chart form.

Pupils are tested, using Edword, on creating a form letter, some simple copy-typing and the production of a restaurant menu or similar document with everything set out as effectively as

Turn to Page 78 ▶

> *Pupils designed and produced an analogue port interface amplifier marketed to other schools*

◄ From Page 77

possible.

There is no doubt that Pool – in collaboration with two nearby schools – has pioneered a most effective GCSE course in computing and microelectronics – and won high praise from the visiting H.M. Inspector as a result.

The full course involves a choice of eight from a total of 12 modules:

- Databases and spreadsheets
- Word processing
- Introductory programming
- Computer graphics
- Further programming – adventure-writing techniques
- Further programming – datafile handling
- Microelectronic wiring and assembly
- Electronic systems
- Digital microelectronics
- Computer interfacing
- PCB design and technology
- Information technology and life skills

This is followed by a major project. One practical outcome was the fact that pupils designed and produced an analogue port interface amplifier which was then successfully marketed to other schools in Cornwall.

The overriding impression gained by my visit was of an intensely practical department that is highly successful in communicating basic skills to an increasingly younger age range of pupils.

Bill Lamin is not a computer studies freak, but a dedicated teacher seeking to make the BBC Micro as widely available as possible within the whole school curriculum.

The school also has a small network of Nimbus machines, but the impression I gained was that the Nimbus-net had yet to demonstrate the versatility and effectiveness of the BBC Micro Econet system.

Interestingly enough, the Nimbus-net is largely used for administration at Pool. Yet a recent Cornwall County Council report has this to say: "It is clear from this increasingly sophisticated software that the range of RM Nimbus machines predominant in use (the PC models) will prove increasingly slower than desirable".

What makes things all the more strange is that there is a suggestion that these increasingly inconvenient machines might be shifted from administration to educational use – where there are likely to be even more micros on the network – thus making things even worse. It seems to me that there is a strong case for continuing national and local support of the BBC Master and associated Econet systems in schools for some considerable time to come.

Schools wondering about embarking on a similar GCSE course to Pool's could contact Bill Lamin, Pool School, Church Road, Pool, Redruth, Cornwall. The surprising thing, in view of the H.M. Inspector's favourable comments, is that this course is not more widely available in Cornish schools.

C.C.S.'L FIX IT

FIXED PRICES!!
FIXED TIME!!
FIXED COMPUTER!!

ALL REPAIRS GUARANTEED 6 MONTHS

BUSINESS PACKAGE! We cover all of your computer equipment under our blanket contract, but you only pay for the faulty equipment!! SAVE £££'s!!! Ask for our package offering unbeatable deals to suit you including collection, delivery, same day service!

EDUCATION PACKAGE! We have THE Education Package! Generous Discounts! Collection and Delivery! Fixed Prices! Ask for our EDUCATION PACKAGE!

RETAIL PACKAGE! Don't be ripped off! We offer FIXED LABOUR charge! Parts at competitive prices! Ask for our RETAIL PACKAGE!

We specialise in IBM/PC Compatibles REPAIRS and UPGRADES. Quality Japanese Disc Drives and Hard Discs!
We also specialise in BBC Acorn Computer REPAIRS and SALES of Printers, Disc Drives and Monitors!
OUR PEDIGREE: We carry out all in-house repairs and upgrades for VIGLEN Ltd. All our technical staff are ex-Viglen Employees.

Tel: 01-571 3752/3763 Fax: 01-571 3095

Official Orders from Educational, Local Authorities and PLC's Welcome

Clarke Computer Services
The Maintenance People 1st Floor Unit 7,
Trumpers Way, Hanwell, London. W7 2QA

WORLDS WITHOUT WORDS
SNATCH
STRETCH
DINOSAUR DISCOVERY
BIG CALCULATOR
DRAGON WORLD
ZOOPAK
BOX OF TREASURES
BUSH RESCUE
TELE-BOOK

SEND A5 22p SAE FOR BROCHURE OF OUR RANGE
OF QUALITY EDUCATIONAL SOFTWARE PACKAGES
4MATION EDUCATIONAL RESOURCES, LINDEN LEA,
ROCK PARK, BARNSTAPLE, DEVON EX32 9AQ. TEL: 0271 45566

GRANNY'S GARDEN
FLOWERS OF CRYSTAL

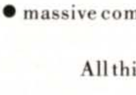
4Mation

BBC Acorn User Show

BBC ACORN USER, with the backing of the BBC and the enthusiastic support of Acorn Computers, have together planned what could be the most exciting computing event of the year.

The new, all-action BBC ACORN USER SHOW is back, at the first home of BBC TV – Alexandra Palace featuring:-

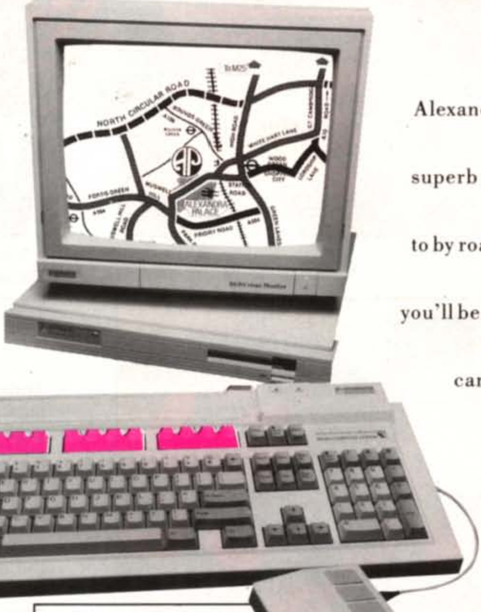
- new product launches
- new software



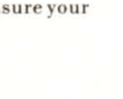
- informative seminars
- technical clinics
- workshops
- demonstrations
- massive computing exhibition

All this and more will make the new BBC ACORN USER SHOW a real must for everyone interested in computers and their applications.

There are daily competitions, free draws with fabulous prizes to be won and celebrity guest appearances.



Facilities at the tastefully restored Alexandra Palace are simply superb and it's so easy to get to by road, rail or tube. If you're driving you'll be glad to know there are 2000 free car parking spaces. So why not make a day of it? Apart from the beautiful grounds you'll find something interesting and exciting around every corner.



Why not save time and money by booking your ticket in advance? Cut the coupon now and ensure your priority booking.

THE 1989 BBC ACORN USER show

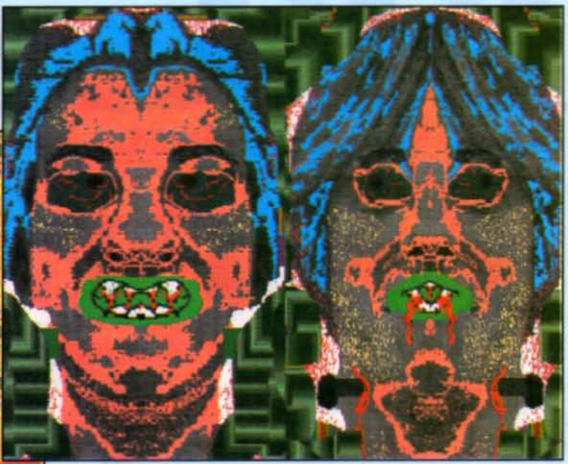
ALEXANDRA PALACE · LONDON
Friday July 21st 3pm-9pm
Saturday July 22nd 10am-6pm
Sunday July 23rd 10am-6pm

BOOK NOW AND SAVE

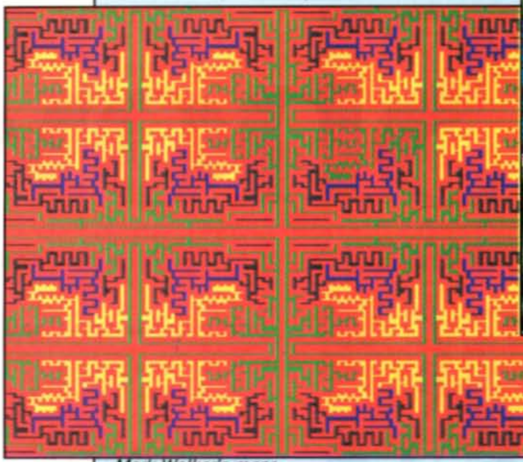
Advance Tickets: Adults £2.50 Under 16s £1.50 **At the door:** Adults £3.50 Under 16s £2.50

Please send me________ Adult Tickets at £2.50 each
Please send me________ Under 16s Tickets at £1.50 each.
I enclose cheque/PO for £________ payable to SAFESELL Ltd., Market House, Cross Road, Tadworth, Surrey KT20 5SR. **DON'T SEND CASH.**
Name________
Address________

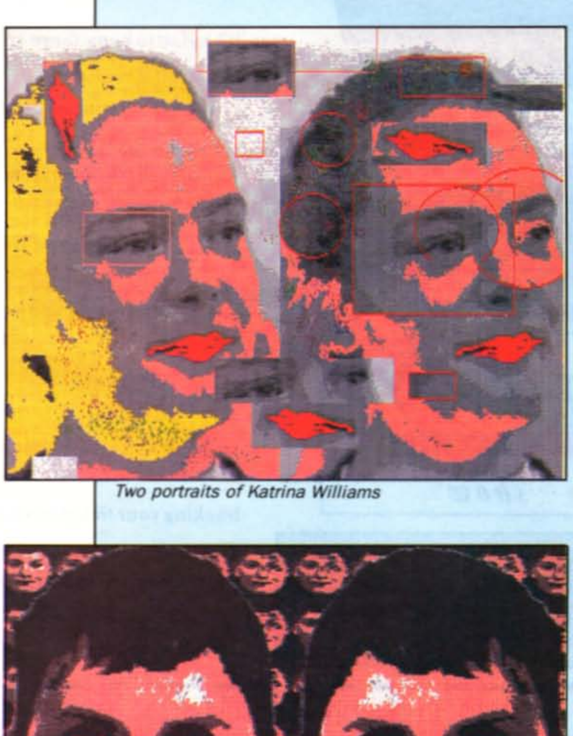
MC 1



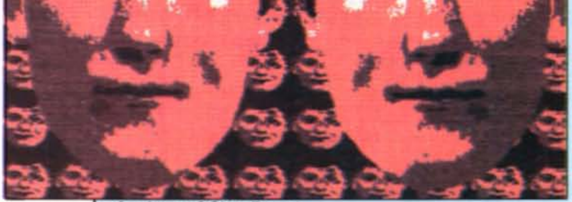
Lucy Fletcher experiments with symmetry



Mark Walker's maze



Two portraits of Katrina Williams



A mirror of Glen Baxter

WE considered the remarkable graphics capabilities of Pro-Artisan in the July issue of *The Micro User*. Now let's take a look at the practical aspects of this powerful package. The work done in our school's Art Department has so far been of two kinds: The first project the pupils did with Pro-Artisan was to design a maze, the route covering as much of the screen as possible by the use of dead ends and false trails.

This task was made easier by the use of the Gridlock option set to a fairly small size so that pupils could align walls and make sure that the gaps and end sections were in step. It also made editing the design easier as gaps could be made in line with corners and ends of nearby sections.

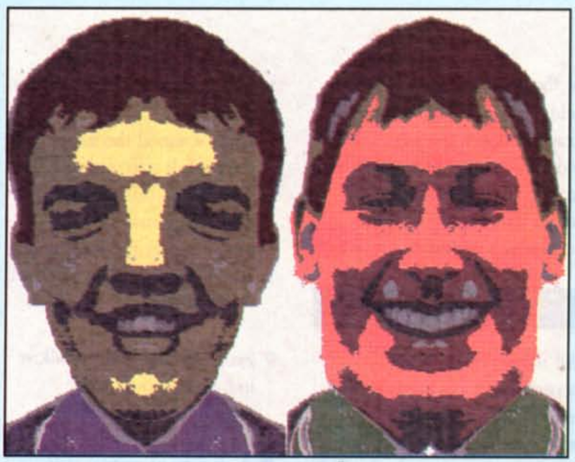
The completed maze designs were then reduced to quarter size and mirrored horizontally and vertically. The resulting maze – four times the complexity of the original – had then to be edited to make use of all the screen space. Once complete, it was coloured in.

While some of the mazes didn't work too well some colour schemes transformed them into very nice images. An example is illustrated here – work done by Mark Walker which was further reduced to a 16 panel maze and still functions as a complete one which uses the whole of the screen for its route from start to finish. It looks good, too.

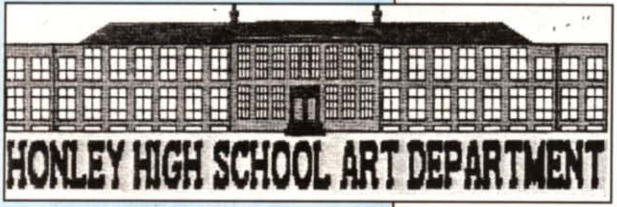
The second project involved the pupils using Pro-Artisan, a video camera and the Watford Video Digitiser to produce black and white images of themselves. Once these were of an acceptable quality they were worked on in two contrasting ways. The first was to simply fill in areas of the portrait after simplifying the 16 shade grey scale to eight or less. The advantage of this is that the areas of single colour are much larger and therefore easier to target with the tip of the paint-roller icon.

The other project was to experiment with copying parts or all the face to produce a secondary image which may bear little relation to the original photographic portrait. An example of this can be seen in Katrina Williams' work, where she has produced two versions of her single digital portrait.

One interesting development was some pupil's experiments in symmetry. When flipping half of their face horizontally, some students had perfectly symmetrical faces while others were totally



Two faces of Philip Smith


HONLEY HIGH SCHOOL ART DEPARTMENT

Simple geometric design is very easy

asymmetrical. By flipping the left-hand side of their face to the right and flipping the right-hand side to the left on two separate images of their face, they produced two completely new faces, giving them three in all.

Glen Baxter's work demonstrates symmetry – as well as sprite-fill – and Lucy Fletcher's and Philip Smith's work illustrate asymmetry.

Another kind of work which would be easier, quicker and more interesting is that of architectural design. The example I produced to illustrate my pupil's next project is of Low Moor Chapel in Bradford. It started out as a straightforward drawing which took a couple of hours. It would have taken longer but I only needed to draw half the building, and even then some of the elements only required half to be drawn.

I used the Zoom option a great deal, but also relied on copying and rescaling as well as sprite grabbing and repositioning. The texture was produced using the Pattern option. While not a very complicated piece of work it illustrates the shortcuts available in this kind of computer aided architectural design. A bit more resolution, especially vertical, would be of use in this type of work.

One of the joys of using Pro-Artisan is the intuitive way of working it offers. If you have used Artisan for a while you'll have no problems adjusting. It offers the same as Artisan, but to a much more sophisticated level. It also offers several powerful new tools which might be used for the creation of very sophisticated pieces of computer aided art and design. The possibilities offered by the combination of tools to produce unique effects is also one of it's main attractions.

The only drawback I can see so far is the fixed palette. I would have liked a user-definable set of 256 colours which could have been stored in the multi-file with colour sets and fonts.

Pro-Artisan in the class

Steve Bruntlett shows how a powerful graphics package can be used effectively in schools

Steve Bruntlett teaches Art and Design at Honley High School in Huddersfield and has been using Pro-Artisan in his teaching for six months.

S·C·A·N LIGHT

The Hardware

Scan-Light consists of a half-width expansion board (that will fit into any Archimedes), with on board ROM software and a choice of scanners. The hand-held scanner is able to scan or digitise pictures, text, signatures, diagrams from loose pages and books at 200 dots per inch. The full width version can scan complete A4 pages of information while the half-width scanner is restricted to a scan width of 105mm (just over 4 inches).

Both scanners have a brightness control and two different scan modes—normal monochrome mode suitable for line graphics or text, and a dithered mode suitable for photographs or half tone pictures.

Scanning a document is simple, the scanner is placed at the top of the page, the scan button is held down and the scanner dragged down the page. As it moves over the document the scanned image is shown on screen and captured in the computer's memory.

The Software

All the necessary scanner controlling software is included on a ROM as part of the interface board—it does not require programs to be loaded from disc.

The software is WIMP based and completely RISCOS compatible. This ensures it is both easy to use (all its features are controlled by menu options) and that it can multi-task with other RISCOS applications and run under the RISCOS desktop. (It is also completely compatible with the older Arthur operating system). Software features include:

- A full page preview is displayed, as the image is scanned, showing the digitised image as the scan progresses down the page.
- Once scanned the image is shown full size within a re-sizeable, scrollable window. The image may be magnified or reduced by any amount from 1% to 999% of original size.
- Pixel editing facilities allow individual pixels to be drawn or "undrawn".
- A variety of printer drivers is included to transfer the image to a range of dot matrix, inkjet and laser printers.
- A special grey-scale preview mode anti-aliases the scanned image to produce a true grey-level picture, allowing near photographic quality images to be obtained.
- Scanned images, or any selected part, may be saved in a variety of ways:
  (i) As a compressed data file (saves disc space).
  (ii) As a monochrome sprite.
  (iii) As a 16 grey-level anti-aliased sprite.

The latter option is ideal for incorporating pictures or photographs into other programs such as Paint and Draw or any DTP program such as the Acorn DTP or Impression programs.

Scan-Light

Now you have twice the choice!

Scan-Light, in conjunction with the outstanding graphics facilities available on the Archimedes, finally takes computers away from the text only background to the point where they can handle both text, graphics and digitised pictures with equal ease.

Scan-Light Junior

This half-width scanner provides a low cost alternative to the full A4 width version. It offers the same facilities and runs with exactly the same software but is limited to capturing 4 inch wide images. In addition, Scan-Light Junior offers a choice of scan resolutions from 100 dpi to ultra-high 400 dpi.

Prices

Scan-Light Junior £189.00 + VAT for half-width scanner, interface board and software.

Scan-Light £449.00 + VAT for A4 width scanner, software and interface board.

Access and Barclaycard welcome.

Scan-Light runs on both the Arthur and RISCOS operating systems, and requires a 1 MByte machine.

Money-Back Guarantee

We offer a full, no quibble, money back guarantee with Scan-Light. If for any reason you are not satisfied with this product you may return it for a full refund. This is in addition to our normal parts/labour guarantee and our free software update service.

See us at
The BBC Acorn User Show
Alexandra Palace
21-23 July 1989
Stand No. 34/36

The scanner, interface and software for the Archimedes

Computer Concepts Ltd

Gaddesden Place, Hemel Hempstead, Herts HP2 6EX
Tel: Hemel Hempstead 0442 63933

1

Watford Electronics

Jessa House, 250 Lower High Street, Watford WD1 2AN, England
Tel: Watford (0923) 37774 Tlx: 8956095 Fax: 01 950 8989
Shop Hours: 9am to 6pm (Mon.-Sat.) Thursdays 9am to 8pm
All prices exclusive of VAT; subject to change without notice & available on request.
Credit Card Orders (ACCESS & VISA) Tel (0923) 33383 or 50234 (24 Hours)

Acorn
The choice of Experience

The choice before and after the experience

Archimedes micro

Now supplied with the New RISC OS

System	Basic	Mono	Colour	Multiscan
305	£725	£785	£924	£1144
310	£899	£959	£1098	£1318
310M	£959	£1019	£1158	£1379
410/1	£1199	£1259	£1398	£1619
420/1	£1699	£1759	£1898	£2119
440	£2499	£2559	£2698	£2919

Archimedes A3000

Price: £649

0% FINANCE

We are once again able to offer 0% finance for the purchase of an Archimedes Micro. For further details please write in or telephone 0923 37774 ext 203.

SPECIAL OFFER

Buy an Archimedes micro from us at above prices and we will conbtribute 10% of the money you spend, towards the purchase of a printer, disc drive or any Hardware or Software of your choice.

ACCESSORIES

NEW Multitasking RISC OS	£29
0.5 Mb RAM for 305	£139
ROM Podule Acorn	£56
ROM Podule (Computer Concepts)	£45
ROM Podule (C C) with Battery Backup	£59
2 Podule Backplane + Fan (Acorn)	£37
2 Podule Backplane (Watford)	£25
4 Podule Backplane (Watford)	£38
Backplane FAN only (for Hard Disc)	£9
2nd 800K Floppy Drive (305/310)	£118
I/O Podule (with Analogue port, User port, & 1MHz bus)	£80
MIDI add-on to I/O Podule	£37
MIDI Expansion Card	£65
Sound Sampler Mono (Armadillo)	£129
Sound Sampler Stereo (Armadillo)	£166
Sound Sampler Stereo/Midi (Armadillo)	£186
Chromalock Podule	£280
20 Mb Hard Disc & Controller Card	£469
Watford's latest 20 Megabyte Hard Disc, Controller Card & Utilities Software	£379
Econet Network Board	£49
Archimedes IEEE Interface Adaptor	£269
Dual RS232 Podule	£195
16 bit parallel I/O Card	£195
PC Emulation Pack incl. MSDOS 3.21	£65
Archimedes Reference Manual	£29
Arm Assembly Lang. Prog. Manual	£15
Archimedes BBC Basic Guide	£20

By popular demand, we are now supplying refurbished and fully guaranteed BBC Micros with Disc Filing System
(Please telephone for price & availability)

Computer Concept's Software for Archimedes on Disc

A. Interword	£27	A. Spell-Master	£48
A. Interchart	£27	A. Intersheet	£27

GRAPHICS, ART, DESIGN & GAMES

Artisan	£31	Gamma Plus	£60
Pro Artisan	£140	Graphic Writer	£23
Support Disc	£16	Autosketch	£69
Toolkit (Beebug)	£32	Toolkit (Clares)	£31
Arc Termulator	£56	Zarch	£16
Alerian	£12	Conquerer	£20
Minotaur	£11	Missile Control	£13
Kermit	£46	Enthar Seven	£29
Archeffect	£20	Archeffect	£20
ArcTFS	£25	Lingenuity Presenter	£24
Render Bender	£66		

MINERVA's Archimedes Software

Sigmasheet	£57	Gammaplot	£57
Deltabase	£24	System Delta+	£69
System Delta + Reference Manual			£25
Home Accounts*	£42	Sales Ledger*	£53
Stock Manager*	£53	Purchase Ledger*	£53
Nominal Ledger*	£53	Reporter	£20
Ancestry	£59	Mailshot	£33
Order Processing/Invoicing*			£53
School Administrator			£66

**** Requires System Delta***

WORDPROCESSORS

Wordwise +	£18	Pipedream	£89
Image Writer	£25	P. Spellchecker	£40
Interword ROM	£35	View	£49
1st Word Plus	£75	Viewspell	£32
Archie Spell Master	£39	ViewIndex	£12

DATABASES

AlphaBase	£39	Flying Start II	£80
Viewstore	£49	System's Delta+	£60

SPREADSHEETS

Intersheet ROM	£35	Viewsheet	£49
Sigmasheet			£59

BUSINESS GRAPHICS

GammaPlot	£59	Interchart ROM	£25

INTEGRATED PACKAGES

Logistix – Database, Spreadsheet, Time Management & Business Graphics **£94**

Archimedes to BBC SERIAL LINK

Using this simple data link, it is possible to solve all your BBC to Archimedes data transfer problems. The kit is supplied with a disk, and the necessary cable to connect the two computers.

Only £15

CREDIT TERMS now available.
In these days of expensive borrowing, we have negotiated a special deal for our customers, which allows us to offer you, low cost finance scheme at 12.25% per annum, typical APR 25.5%. For further details please telephone or write in.

Archimedes 5¼"/3½" Disc drive Interface

With this interface it is possible to connect almost any 5¼"/3½" disc drive with its own power supply to the Archimedes. NO SOLDERING is involved. Supplied complete with necessary lead.

Only £21

Watford's 20Meg & 40Meg Archimedes Hard Disc

Watford Electronics' 20Meg & 40Meg hard disc fits internally into the Winchester slot provided. It is fully compatible with Acorn's hard disc upgrade, (the only difference is our low price). Price includes the Hard Disc Drive, Controller Podule & fitting instructions.
P.S. This upgrade requires a backplane and a fan.

Arch HD20 – 20Meg Hard Drive	£379
Arch HD40 – 40Meg Hard Drive	£425

LANGUAGES (Archimedes)

ANSI 'C'; ISO-PASCAL; FORTRAN 77; all Release II.	£94 each
Cambridge LISP; PROLOG X	£181 each
LOGOTRON LOGO	£55
BASIC Compiler	£89
Archimedes Assembler	£189
TWIN EDITOR	£27

BBC MASTER

MASTER 128K Micro incl. Acorn's: View, Viewsheet, ADFS, BASIC Editor & TERMINAL plus £35 worth of FREE OFFER (see below) **£439**

FREE . . . £50 worth of Software

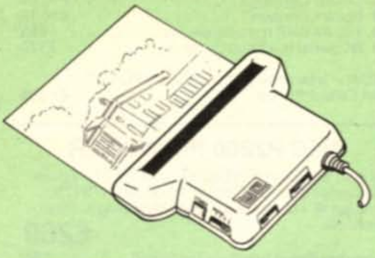
Gemini's OFFICE MATE & OFFICE MASTER packages on Disc consisting of: Database, Spreadsheet, Beebplot graphics. Accounts packs: Cashbook, Final Accounts, Mailist, Easyledger, Invoice & Statements, Stock Control, and the popular, Master Advanced Reference Manual.
With every BBC Master purchased from us this month.

Securicor Carriage on Micros £7

ADD-ONs & ACCESSORIES

Turbo 65C102 Add-on Module			£118
Econet Module for the Master			£49
Twin ROM Cartridge for Master			£8
Quad ROM Cartridge for Master			£12
Universal Processor Adaptor			£75
Master Reference Manual I			(No VAT) £14
Master Reference Manual II			(No VAT) £14
Master Advance Ref. Manual			(No VAT)£17
64K Upgrade Kit for B+			£32
Acorn 1772 DFS Kit complete			£49
ECONET Upgrade Kit for BBC			£42
ALL ECONET UPGRADES Available			
ARIES' Professional IEEE Interface			£238
Morley Teletext Adaptor with ATS Rom			£99
Filestore E01S	£899	Filestore E40s	£799
Filestore E60S	£1080	Ecolink	£270

Archie Hand Scanner



Watford Electronics is now able to offer a complete hand held scanning package, possibly the most essential addition to any desk top publishing system, for only £149. The package includes the most comprehensive utility software available for the Archimedes, a high quality hand held scanner, and all necessary documentation to get you going straight away.

The scanner is capable of scanning up to an amazing 400 dots per inch (DPI)! The scanning area is 4" wide, and the height is only limited by the maximum amount of memory available. The dot resolution may be switched to 100, 200, 300 or the maximum 400 dpi. One of four operating modes may be selected offering either pure monochrome scanning, or one of three grey level modes. The grey level modes use different size dither patterns to represent up to 16 shades of grey. There is also a dial to allow the "brightness" to be adjusted over a wide range, in order to optimise the quality for any specific image. The scanner interface is a standard, single width, expansion card (podule) which plugs into the Archimedes' backplane. The socket on the rear panel connects the scanner by 1.8 metres of cable.

SCANNER SOFTWARE

Full use is made of the windowing and the multi-tasking facilities of RiscOS. The software is supplied in a 64Kbyte ROM located on the interface board. The scanner appears as a small icon on the desktop icon bar, and the software is retrieved from the ROM simply by clicking on that icon. As you scan a page, the image appears in the scanning window on the screen, scrolling up in real time. The other facilities included in the software are.

Cropping and scalling to any size including stretching and squashing in X and Y directions separately.

Colour tinting.

X and Y flip.

Edge detection which turns solid objects into outlines.

Selective directional copying which allows features (i.e. lines or text) to be made thicker or thinner.

Scanned images may be saved as sprite files or transferred directly into other RiscOS applications (DTP, Draw, Paint) simply by dragging the sprite file into the application's window. Sprites may also be generated using anti-aliasing. This greatly improves picture quality and is particularly effective when scanning material with a range of grey tones, such as photographs. Images can be printed on any printer that is supported by a RiscOS printer driver, with optional settings for portrait or landscape modes, image scale and positioning. Images are printed using the full resolution of the printer and are not limited to the screen resolution.

On-screen help is provided via the RiscOS interactive help facility. Calls are also provided in the ROM for users wishing to write their own software, incorporating the use of the scanner.

£149

Archi Graphic Tablet

This package allows Archimedes users to take advantage of the excellent Aries low cost graphpad (sometimes called a digitiser tablet, but not to be confused with a video digitiser!)

The Archi Graphpad offers performance and accuracy comparable to other graphics tablets priced at well over £400, and has the useful addition of a liftable cover, which can hold tracing material or menu templates securely.

The software, which is in the form of a relocatable module (RM), intercepts the system calls which control the mouse, and so allows virtually all mouse based Archimedes software to be controlled using the tablet without any modification. The only exceptions are programs which use the serial port, as the tablet is physically connected to this post itself.

Graphics programs such as Artisan, Pro Artisan, AutoSketch, Oak DTP, and the RiscOS Draw, Paint and DTP packages are considerably enhanced by the use of the graphics tablet as opposed to the mouse, although it can, of course, be used with any other mouse driven application.

The software allows the user to define how much of the tablet's 12" x 12" working area to use, allowing very fine control when drawing freehand or tracing from a variety of differently sized drawings, diagrams, photographs, etc.

The tablet driver is compatible with all Archimedes machines, and with both Arthur and RiscOS operating systems.

The pointer is moved via a four button puck complete with transparent lens and crosshairs for optimum accuracy. Three of the buttons emulate the Archimedes mouse buttons precisely, the fourth being used for special functions such as setting the position and size of the active working area. The buttons may be re-mapped to allow the relationship between tablet and mouse buttons to be redefined, should this be required.

The software is supplied with a special adaptor lead to connect the tablet to the Archimedes' serial port, and a power lead which plugs onto the Archimedes' main board.

Launch Price £259

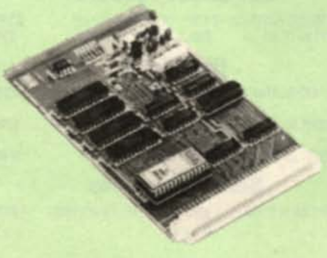
(Price includes Tablet, leads and software)

Aries FAX-2000 Stand-Alone Fax machine

The first low cost professional fax machine. For just £499 you might not expect our new FAX machine to have the facility to send and receive both text and graphics, a built in phone, photocopier facility, built in speaker with volume control, all with high speed, group 3 compatibility – but it does and much more. Made by Brother of Japan. BABT approved.

£499

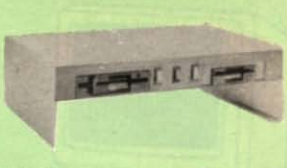
Archimedes Real-Time Digitiser



Price £249 Please write in for further details.

Watfords' Archimedes Video Digitiser is the most sophisticated digitiser ever designed for a micro. It provides a fast and flexible means of capturing images from a video camera or recorder for display and manipulation on the Archimedes range of Micros. Off-air television signals may also be digitised via a video recorder or TV tuner.

Disc Drives DP35-800S



A Double disc drive – with a difference! Times are changing fast for the floppy disk, and whilst the current standard for the BBC B and Master Series is the 5.25 inch disk, the standard for the future will most certainly be the smaller; faster and more reliable 3.5 inch disks – now a standard feature of both the Master Compact and the Archimedes Series.

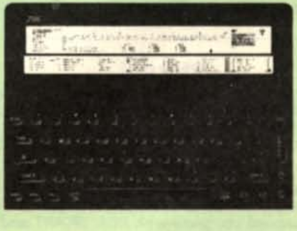
To support the present disc drive users, and cope with the future, we have designed our own plinth-mounted disk system – called the DP35 800S, it contains both the 5.25 inch and the 3.5 inch drive formats as well as offer a firm and rigid support for a monitor on top. With the BBC Micro underneath, the plinth makes a surprisingly small footprint on the desk – leaving you more space to work with.

The 5.25" disc drive is 40/80 track switchable. For ease of access, the switches are front mounted. DP35-800S has its own power supply, independent of the BBC Micro.

Watford's new plinth enables users to read, write and format disks both in DFS and ADFS format – currently the accepted standard for the Master Compact and the Archimedes, it also enables the user to read disks written for the Archimedes. Ideal for both BBC & Master.

Launch Offer: **£165** (carr. £7)

Z88 Sinclair's Portable Micro



WE are the largest Z88 Dealer in the UK

FREE

With every Z88 purchased from us this month, we are giving away absolutely FREE, a Z88 to BBC Interface Link, 4 rechargeable batteries and a compact Mains Battery Charger worth £38.

ACCESSORIES

32K RAM Pack or 32K PROM Pack	£17.35
128K RAM Pack or 128K ROM Pack	£43.40
512K RAM Pack	£169
Z88 Spellmaster for Pipedream	£51
Z88 Carrying Case	£8.50
Z88 Computing Book	£9.95
AA Nicad Rechargable Battery	£1.50
Battery Charger Compact & Fast	£6
Z88 Serial Printer Cable	£8.65
Z88 Parallel Printer Cable	£24.00

● Z88 to BBC Link	£22	● Z BASE	£56
● Z88 to PC Link II	£30	● Z TAPE	£42
● Z88 to Macintosh	£49	● Z TERM	£42
● Z88 Mains Adaptor	£8.65	● Z88 Modem	£145

Continued ⟶

MONITORS

MICROVITEC 14"

● **1431** – Standard resolution as used on the BBC television computer programme	£175
● **1451** – Medium resolution, suitable for word processing in mode 0	£219
● **1441** – High res, exceeds the capabilities of the BBC micro	£359
● **1431AP** RGB + PAL and AUDIO	£199
● **1451AP** RGB + PAL and AUDIO	£255
● 2030 CS 20" Med Res	£380
● 2040 CS 20" Hi Res	£675
● Dust Cover for Microvitecs	£5.50
● **Touchtec 501 Touch Screen**	£239

14" MULTISCAN COLOUR

● **TAXAN** Multisync 770 Plus	£439
● **TAXAN** Multiscan 870 16" Monitor	£499
● **EIZO** 8060H – For technical info. read the review in Micro User, Jan. '89	£429
● **EIZO** 8060H Multiscan	£449
● **EIZO** 9060S Super High resolution multiscan monitor for a wide range of applications. 800 dots x 600 lines. Display for high res VGA. 0.28 Dot pitch	£469

TAXAN 12"

● Super Vision 3 – **Type 625** Super Hi-res RGB Colour, Green/Colour Switch	£279

PHILIPS

● **BM7502** 12" Hi-res Green Monitor	£69
● **CM8833** 14" Med. Res Colour Monitor	£219

STAR BUY

- **PHILLIPS 14"** Medium Res, dark glass, attractively finished Colour Monitor – supplied complete with RGB, SKART and Audio/Phono Inputs. A push-button switch toggles between Hi-Res monochrome green text mode and full colour display. (Please state the type of Connecting Lead you require).

ONLY £199

Dust Cover for Phillips Monitors	£6

SPARE LEADS

BNC Lead for Zenith or Philips	£3
Skart Monitor Lead	£5
RGB lead for TAXAN Monitors	£3
Archimedes Colour Monitor Lead	£7.50

SWIVEL BASES

By simply placing your monitor on one of our front adjustable professional swivel bases (see drawing at the top), you can easily adjust the monitor viewing angle.

for 12" Monitors **£8** (carr. £2.50)
for 14" Monitors **£12** (carr. £2.50)

Anti Glare VDU Screen

These extremely effective, easy to install, 12" & 14" VDU screens eliminate harmful glare, improves contrast on colour monitors. Increases productivity in offices. A must for wordprocessor users.

£12

PLOTTERS

● Plotmate A4S	£379	● Plotmate A3M	£549

Roland Plotters

● **DXY 880A**	£560	● **DXY 1100**	£630
● **DXY 1200**	£879	● **DXY 1300**	£1035

TAXAN KP-815 PRINTER

Offer Price £155

Taxan KP915 132 Column	£275
RS232 Interface	£49
RS232 Interface with 2K Buffer	£69
RS232 Interface with 16K Buffer	£89

Panasonic KX-P1081

UK's most popular printer.

(Price inludes, FREE a 4ft Printer Lead, and a Dump Out 3, Screen Dump ROM worth £35 with every printer purchased from us).

SUMMER SALE OFFER only: **£139**

Optional RS232 Interface:	£39

Panasonic Printers

● **KX-P1124** 24pin 80col. 192/63	£269
● **KX-P1180** 9pin 80col. 192/38 CPS	£169
● **KX-P1540** 24pin 136col. 240/80 CPS	£435
● **KX-P1592** 9pin 136col. 216/45 CPS	£275
● **KX-P1595** 9pin 136col. 288/61 CPS	£355

● **Panasonic KX-P4450** LASER PRINTER
Latest technology at Watford's special offer price **£1,499**

● Spare Toner	£29	● A4 Feeder	£55
● Drum Unit	£149	● Developer	£115

Panasonic Accessories

Cut Sheet Feeders

KX-P1592/1595 (P32)	£175;	KX-P1540 (P35)	£185
KX-P1124 (P36)	£88;	KX-P1180 (P37)	£79

BUFFERS

P12 4K Buffer Board for 1081	£55
P42 32K Buffer Chip for 1592/1595	£49
P43 32K Buffer Chip for 1540/1124	£49

Serial Interfaces

P17 P1081/1592	£32	P19 P1124/1180	£55

Original Panasonic Ribbons

Guaranteed to last 3 million characters

P110 for KX-P1081; 1592 & 1595			£8
P115 for KX-P1180	£8	P145 for KX-P1124	£8
P140 for KX-P1540	£10		

INTEGREX COLOUR JET

● Colour Jet 132 Printer	£515
● Paper Roll	£6.50
● Screen Dump Software	£10
● Colour Cartridge	£16.50
● Black Cartridge	£10.35
● 100 A4 OHP transparencies	£55
● 8K Serial Interface Optional	£123
NEW – Intergrex COLOURCEL NPQ Ink Jet Colour Printer	£2,695

NEC P2200 PINWRITER

24 pin; 80 column; 168CPS – 56CPS LQ; Epson LQ compatible, 7K Buffer; 7 resident FONTS, Friction & Tractor feed, front load single sheet feed, etc.

£269

Pinwriter Serial Interface (optional)	£55
P2200 Cut Sheet Feeder	£59
Additional Font Cartridge	£25
NEC P2200 Pinwriter Ribbon	£6

NEC PINWRITER P6/P7 Plus

NEC P6+ 80 columns	£439	**NEC P7**+ 136 columns	£575
Colour Option	£74	Serial Interface	£73
Cut Sheet Feeder	£125		
NEC Ribbons for			P6 **£8**; P7 **£9.50**

Star Printers

Star LC10	£169	LC10 Colour	£215
Star LC24-10	£279	NB24-10	£449
LC10 Colour Ribbon	£6	Cut Sheet Feeder	£65

Brother HR20 DaisyWheel Printer	£339

EPSON PRINTERS

EX800	£410	LQ860	£539
EX1000	£564	LQ1050	£570
FX850	£315	LQ1060	£679
FX1000	£425	LQ2550	£925
FX1050	£439	LQ2500+	£839
LQ500	£275	LX800	£169
GQ3500 Laser	£1150	SQ2500	£975
LQ850	£430		

CUT SHEET FEEDERS for

EX800 **£149**; FX800/LQ800 **£149**; FX850/LQ850 **£149**; FX1000/LQ1000 **£179**; LQ500/LX800 **£79**; LQ500 **£75**; LQ1050 **£175**.

TRACTOR FEED for

LQ800 **£44**; LQ850/FX850 **£69**; LQ1050/FX1050 **£85**; LQ2500 **£90**; LQ2550 **£90**

ACCESSORIES

● EX800/1000 Colour Option	£55
● EX800/1000 Colour Ribbon	£18
● LQ2500 Colour Option	£65

(Securicor Carriage on Printers £7

EPSON PRINTER INTERFACES

All these interfaces fit inside the printer.

RS232	£32	RS232 + 2K Buffer	£52
IEEE 488	£40	RS232 + 8K Buffer	£79

PRINTER LEADS

BBC Centronics 4' long	£5
BBC Centronics 6' extra long	£7
Compact's Special Centronics Lead	£7
Archimedes Printer Lead 1 meter	£6
Nimbus Centronics Lead	£12
IBM Parallel Lead 1 meter	£6
Double Ended 36 way Centronic Lead 4'	£7
Double Ended 36 way Centronics Lead 6'	£9
MSX Centronics Parallel Lead 4'	£12
RS232 Leads (Various)	P.O.A.

RS-232 GENDER CHANGERS

Male to Female	£4.95
Male to Male	£4.95
Female to Female	£4.95
25 way Male to 9 way Female	£4.90

Listing Paper (Perforated)

● 1,000 Sheets 9½" × 11" Fanfold Paper	£7
● 2,000 Sheets 9½" × 11" Fanfold Paper	£12
● 1000 Sheets 9½" x 11" NCR 2 Part Fanfold	£19
● 1,000 Sheets 15" × 11" Fanfold Paper	£9
● 1000 Sheets true A4 Fanfold Paper 70gms	£11
● 2000 Sheets true A4 Fanfold Paper 70gms	£19
● Teleprinter Roll (Econo paper)	£4

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50. 2K Sheets £3.00

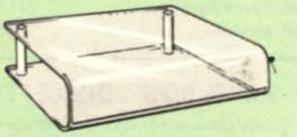
PRINTER LABELS

(On continuous fanfold backing sheet)

1,000	90 × 36mm (Single Row)	£5.00
1,000	90 × 36mm (Twin Row)	£4.90
1,000	90 × 49mm (Twin Row)	£7.50
1,000	102 × 36mm (Twin Row)	£6.25

Carriage on 1,000 Labels £1.00

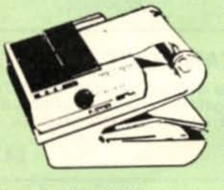
Perspex Printer Stand



Give your Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand. The printer sits on top and the fanfold paper rests neatly underneath, thus occupying the same space as the printer footprint.

Only: £16 (carr. £3)

Professional Printer Stand



This new professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Additional facilities include: Easy access to paper from both sides, used with both top and bottom feed paper and with its dial controlled paper feed system with adjustable deflector plates it ensures smooth paper flow and automatic refolding.

***80 Column version £16** (carr. £3)*

***132 Column version £16** (carr. £4)*

PRINTER RIBBONS & VARIOUS DUST COVERS

Type	Ribbons	Dust Covers
Brother HR15/20	£3.00	–
BBC Micro	–	£3.50
BBC Master	–	£4.00
Archimedes Micro pair	–	£9.00
IBM PCs pair	–	£6.00
RX/FX80/MX80	£3.00	
DMP2000	£3.75	£4.75
EX/LQ800	£4.50	£4.50
EX/LQ1000	£7.50	£5.00
RX/FX80/85/800/MX80	£3.90	–
RX/FX100/1000	£5.75	–
Kaga/Taxan KP810/815	£4.90	£4.00
LC10 (Black)	£4.25	£5.00
LQ500/800	£3.75	£5.00
LQ1050/LQ2500	£8.50	£5.50
LX80/86/800	£3.80	£4.50
M1009/GLP	£3.80	£3.75
Panasonic KX1080/81	£4.00	£4.75
SQ2500	£23.00	£5.50
Star NL10	£3.75	£4.50
Olivetti Ink Jet Cartridges (set of 4)	£9	

Our attractive Dust Covers are manufactured from translucent PVC. The seams are stitched and edges are taped to prevent splitting due to continuous use.

Universal Printer Sharers/Changers

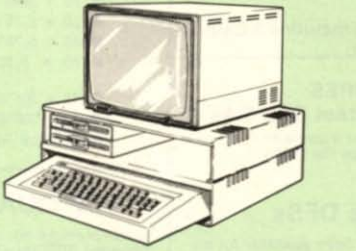
Connect upto 5 Micros to 1 printer or 5 Printers to 1 Micro with our combined, Sharer/Changer. These Units are made to a very high standard. For extreme reliability, they all have Printed Circuit Boards mounted inside the case, (not a Spagetti Junction of wires). Internal connection is made via high quality ribbon cables.

(Ideal for School environments.)

Connects	Serial	Centronics
2 to 1	£20	£22
3 to 1	£27	£30
5 to 1	£36	£39

(Cables extra at £6 each. Please specify type required when ordering)

PLINTHS FOR BBC MICRO, MASTER & PRINTERS



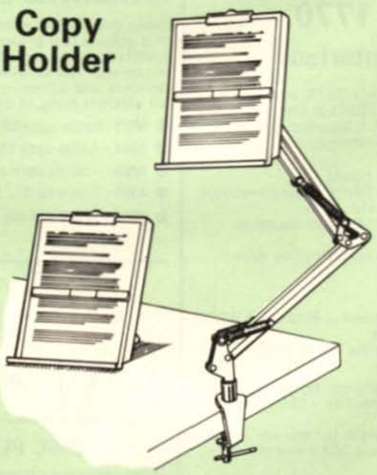
Protect your computer from the heat of your VDU. Our micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and VDU, whilst the double height version provides enough room for our stacked disc drive and other peripherals like, Eprom programmer, music unit or simply discs & stationary. The computer slides neatly in the lower section allowing easy access to remove the lid.

The single printer stand is equally sturdy but instead of cooling slots it has elegant cutouts on the sides. This allows easy access to paper from all sides. Colour: BBC Beige.

Single BBC Plinth	420 x 310 x 105mm **£12**
Double BBC Plinth	420 x 310 x 210mm **£20**
Printer Plinth	420 x 310 x 105mm **£12**
Single Master Plinth	490 x 310 x 105mm **£13**
Double Master Plinth	490 x 310 x 210mm **£24**

(Carr. Single plinth 12; double plinth £3)

Copy Holder



Whether you want to type in your latest program or the draft of a new trilogy, Watford's manuscript holders are superb for holding your paper at the ideal height and angle to allow you to read and type in ease and comfort.

Available in 2 full A4 versions, desk resting and shelf clamping. Paper is held firmly by means of a plastic retaining ruler and a clip grip. (for resting books or magazines, the desk top version is recommended).

Desk Top **£7** (carr. £3)

Angle poise **£12** (carr. £3)

NEW

Handy 2 Way Printer Switch

A handy two way compact printer switch that enables you to connect 2 Micros to 1 printer, or 2 printers to 1 Micro. Attaches easily to your printer, monitor, etc. A low cost solution for educational establishments. Ideal for those wishing to use a dot matrix and a laser printer. Available in two configurations.

Compact AB Switch Centronics	**£20**
Compact AB Switch RS232	**£19**

(Cables extra at £6 each)

MEGABUFFER 256

The Smallest 256K Printer Buffer Unit in the world **38mm x 130mm x 134mm.**

This new Megabuffer 256 from Watford is a full featured 256K Printer Buffer. The features are:

- Improves efficiency by making more efficient use of computer and printer.
- Compatible with any computer and printer that uses Centronics Parallel connections including all BBCs, IBM PCs, etc.
- Total compatibility with all software.
- Cheaper phone bills when using your Modems.
- Ideal for those doing large graphics screen dumps that are slow to print.
- Multi-Copy facility allows you to print several copies via Megabuffer without going through your computer.
- Data Dump facility is included.
- Built in test unit for both the buffer & your printer.

Only £149 (carr £5)

THE EPSON RX-FX-KAGA PRINTER COMMANDS REVEALED

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities – he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out. Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX-KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, PW1080A or any other Epson FX80 compatible Printers like Panasonic KX-P1080/1, etc., with the BBC Micro, both from BASIC and Wordwise.

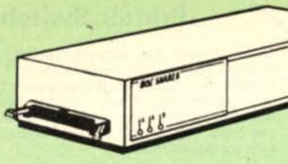
It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

£5.95 (No VAT)

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383

Continued →

DISC DRIVE SHARER



(Ideal for educational establishments)

At last, a low cost alternative to the Econet system. Watford's Intelligent Disc Drive Sharer allows you to connect 3 BBC micros (model B, B+ and Master series) to a single or double disc drive. Running under any DFS or DDFS, this intelligent unit will automatically queue the computers. Each computer has a status light dedicated to it. If it is green you will get immediate access to the disk, and red means that you are next in line. The unit plugs directly into the disc drive socket on each computer and is powered by the mains. (N.B. Not for use with ADFS.)

Launch Price: **£65** Price includes 3 Cables

NOW WITH EXTRA FEATURES AT NO EXTRA COST – Watford's latest DFS 1.44

- Incorporates Acorn's Official Tube Host Code so that those with 2nd processors no longer need to waste a ROM socket on the DNFS.
- Option to DOUBLE the speed of BPUT and BGET.

WATFORD's & ACORN's DFSs

Watford's popular and widely acclaimed DFS has now been available for six years and has gained a large following amongst serious and educational users of the BBC Micro. Owners of Acorn or any other standard DFS can upgrade to our "Ultimate" DFS merely by replacing their DFS ROM. See below for this upgrade. ***(P.S. Watford's highly sophisticated DFS is fully compatible with Acorn standard DFS). (while Acorn's 1770 DFS is fully compatible with Watford's Mk II DDFS)***

Watford's sophisticated DFS ROM only	**£16**
We will exchange your existing DFS ROM for Watford's Ultimate DFS ROM for only	**£12**
DFS Manual (Comprehensive)	*(no VAT)* **£6.95**
DNFS ROM only **£17**	*ADFS ROM only* **£25**

(P.S. Our DFS manual is the only comprehensive Manual available for the BBC micro and covers both Acorn & Watford DFSs).

(The Single Density DFS system is now old technology. Like Acorn, Watford too have decided to replace it with their more up-to-date 1770 DDFS interface. We have informed most of the software houses of this decision in order that they can ensure compatibility with our highly sophisticated and fully Acorn compatible DDFS).

NEW

Watford's MkII 1770

Double Density DFS Interface

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our Mk II DDFS Board with its 1770 Disc Controller, has been adapted to allow the use of Acorn ADFS as well. It also has all the commands of the Acorn's 1770 DFS, plus the added features:

Added features include:

- Acorn ADFS compatible – Use ADFS on our DDFS board.
- Tube host Code – No longer any need to have the DNFS in your machine to use Co-Processors, even the CoPro and Master 512.
- Auto 40-80 Track sensing – no need to fuss with 40/80 track switches (even works with protected disks).
- An extremely powerful 8271 emulation – ensuring compatibility with almost all software.
- New low profile – small footprint board.
- Fits with all third party ROM boards.
- Option to double the speed of file handling operations – BPUT and BGET.
- Operates in both single and double density modes.
- OSGBPB has been recoded, increasing still further the speed of file handling.

Please note that not all DDFS's are capable of providing either the full 80% storage increase or of allowing a file the full size of the disk – Ours allows both of these!

If you already have a DDFS (any manufacturer), and wish to upgrade to our MkII version, then simply return your existing ROM and DDFS board and we will supply the new DDFS for only **£30.00**.

Special introductory offer	**£39.00**
DDFS Manual	(No VAT) **£6.95**
We will exchange your existing DFS Kit for our sophisticated DDFS for only	**£25.00**

Please note, as the MkII DDFS is a hardware and software upgrade, it is not possible for existing Watford DDFS users to simply exchange their ROM for the new version.

DUST COVERS (For our Disc Drives)

Single CLS (without PSU) **£3.20** Twin CLD (without PSU) **£3.85**
Single CS (with PSU) **£3.95** Twin CD (with PSU) **£3.90**

Mysteries of Disc Drives & DFS Revealed

Are you tired of faulty cassettes, and lengthy loading times? Do you want to upgrade your BBC micro to take discs but you get tied up in the plethora of jargon surrounding the choice and use of these systems.

Then The Mysteries of Disc Drives and DFS Revealed is the book for you. It explains in detail the different types of systems available, how they are installed and how to use them. Many examples are given including pre-written programs to call various functions of the DFS available only through Operating System calls. Different types of disc, 40/80 tracks etc. are all explained. This book is ideal for the beginner confused by the plethora of choice available in the marketplace.

£5.95 (Book No VAT)

3M – DISKETTES

3M – SCOTCH Diskettes with Lifetime warranty from Watford Electronics your 3M Appointed Distributor.

10 × 5.25" S/S D/D 40 Track Diskettes (744)	***£6.00***
10 × 5.25" D/S D/D 40 Track Diskettes (745)	***£7.00***
10 × 5.25" S/S D/D 80 Track Diskettes (746)	***£11.50***
10 × 5.25" D/S D/D 80 Track Diskettes (747)	***£11.00***
10 × 5.25" 1.6M D/S D/D High Density Discs for IBM XT and AT	***£16***
10 × 3.5" S/S D/D 40/80 track Discs	***£10.00***
10 × 3.5" D/S D/D 40/80 track Discs	***£11.75***
10 × 3.5" High Density Diskettes	***£25***

TOP QUALITY 3.5" & 5.25" DISKETTES

To complement our range of Quality Discs and Disc Drives, WE are now supplying SPECIAL OFFER packs of 10 Lifetime guaranteed discs. Each disc has a reinforced hub ring. Supplied complete with selfstick labels and a Plastic Library Disc Box.

10 × ***M3*** *3.5" D/S D/D 80 Track Discs*	***£10***
10 × ***M9*** *3.5" Double Side High Density*	***£25***
10 × ***M4*** *5.25" S/S D/D 40 Track Discs*	***£5***
10 × ***M5*** *5.25" D/S D/D 40 Track Discs*	***£7***
10 × ***M7*** *5.25" D/S D/D 80 Track Discs*	***£9***
10 × ***M8*** *5.25" D/S H/D Hi-Density Discs*	***£14***
3" Double Sided Discs	***£2.50*** *each*

FLOPPY HEAD CLEANER KIT

The heads in floppy drives are precision made and very sensitive to dirt. The use of a cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. It is very simple to use. Available in 3½" & 5¼", please specify.

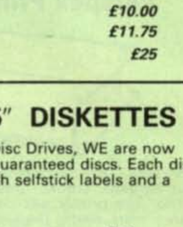
£4

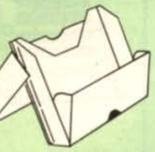
ANTISTATIC LOCKABLE DISC STORAGE UNITS

Gives double protection – Strong plastic case that affords real protection to your discs. Antistatic helps avoid data corruption whilst in storage. The smoked top locks down. Dividers and adhesive title strips are supplied for efficient filing of discs.

M35 - holds upto 50 5¼" discs	**£4.95**
M85 – holds upto 95 5¼" discs	**£6.95**
M25* – holds upto 25 3 ½" Discs	**£4.95**
M50 – holds 50 3½" Discs	**£6.50**
M10 – holds 8 of No. 10 Data Cartridges	**£15**

* Not lockable

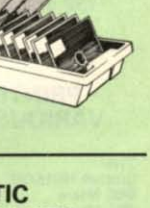




PLASTIC LIBRARY CASES

Holds up to 10 5¼" Discs. **Only £2.00**

DISC PLONKER RACK



When using ones micro, there is a tendancy to have more than one Disc on the desk. This exposes them to the hazards of fingerprints, scratches, dust, coffee and an untidy desk.

Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. Holds upto eight 5¼" discs.

Protection at Only: **£2**

DISC ALBUMS

Attractively finished in black leather look vinyl. Stores upto 20 Discs. Each disc can be seen through the clear view pocket.

£4

Quality Disc Drives from Watford

To help you decide which drive is the most suitable for your needs (and your pocket!), we have produced the table below.

The first capacity given in the first column indicates capacity in single density mode. That within the brackets is the capacity in double density mode. All disc drive type numbers start with the prefix "C".

The tinting on some of the boxes is used to indicate which Drives are 40 track (non-tinted) and which are 80 track (tinted). All our 80 track drives are already fitted with a 40-80 select switch.

***All our Disc Drives are Double Sided and will operate in both Single and Double Density modes.** Extensive experience of the usage of disc drives suggests that the JAPANESE drives currently represent about the best in terms of speed, reliability and overall "elegance" available for the BBC Micro.*

Various UK "manufacturers" of disc drives for the BBC micro (more accurately, "packages" label other manufacturers drives with their own name). We buy the high quality NEC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

If you look around the popular BBC micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, some of the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.

Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. Ideal for Schools & Colleges. We are now able to supply all single disc drives with Power Supply, in either single or dual case. (Dual case has a twin data cable and a power supply capable of driving two disc drives) allows easy expansion to a dual drive unit, at a later date. Prices stated in the pricing boxes below are for single drives in standard single cases. Single drives in a dual case cost an extra £10. (At Watford we anticipate your needs of tomorrow, not just today)!

When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space) your BBC, Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with Watford plinth. (Turn to the 4th page of our advert for the Plinths).
P.S. All our 5¼" Disc Drives with PSU are compatible with the Compact Micro. All you require is the special Compact Disc Drive Cables designed by us.

Our Disc Drives conform to BS415

"Test Bureau Approved for Use in Education"

Capacity	Drives without P.S.U.		Drives with P.S.U.	
	Single	Twin	Single	Twin
400K (720K)	CLS400S £75	CLD 400 £168	CS 400S £85	CD400 £188
800K (1.44M)		CLD 800S £153		CD 800S £163

- TWIN Disc Drive Case, complete with Power Supply & Cables **£43**

Securicor carriage on Disc Drives £5 to £6

*Prefix **C** = Cased Drive*
L = Less PSU
S = Single
D = Double

*Suffix **S** = 40-80 Switchable*

e.g. CLS400S = Cased Disc Drive, Less power supply unit, single 5¼" 400K, (720K in double density); Double sided; 40/80 track switchable.

Cable to connect 5¼" Disc Drives to BBC Compact
Single £9 Twin £12
Special Cable to connect both 3½" and 5¼" Disc Drives simultaneously to the BBC Compact £13

Special 40/80 Disc Drive/DDFS Mk II Offer

- The popular 40/80 track 400K single Disc Drive, Double Sided, cased with Cables. Plugs directly to your Micro.
- Watford's extremely popular DDFS Disc Interface (allows 720K storage). Will run in both, Single & Double Density modes.
- A comprehensive User Friendly Manual.

A Bargain at Only **£119** (£7 carr) (Offer valid while stocks last)

3½" DISC DRIVE OFFER

These top quality 3½" Double sided, 80 track, 1 Megabyte (unformatted each Disc Drives), are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc. They run directly from the BBC B/Master's own PSU.

- **CLS35 400K Unit £69**
- **CLD35 800K Unit £125**

WATFORD's WINCHESTER DRIVES

Undoubtedly the best value for money Winchester Hard disc available anywhere for the BBC Micro.

This 30 Megabyte hard disc is completely compatible with the Acorn ADFS – that's why we have bundled it with each Winchester drive, along with a Utilities Disc.

Finished in rugged metal and fetching BBC beige, the Winchester has an internal fan, so quiet you won't even hear it! A switched mode power supply and a neon-lit on/off switch are there along with a light on the hard disc to tell you when it is working – just compare the price with our competitors' 20 or 28 Mbyte discs!

Compatible with the Master, and the BBc B (with 17 X disc interface).

- 30 Megabyte BBC Hard Disc **£405** (carr £9)

Special BULK OFFER on 5¼" DISCS

PRICES SLASHED

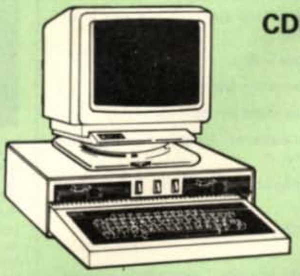
(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)

BULK PACK DISCS in lots of 100

Type	S-S 40T	D-S 40T	D-S 80T
● Without Sleeves	£35	£39	£45
● With Sleeves	£38	£42	£48

DP35-800S

CDPM800S



Twin 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC Micro. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use.

CDPM 800S for the BBC & Master £182
DP35-800 for BBC/Master £165
(For DP35-800S spec. see Page 2 of our advert)
(Securicor Carr. £7)

(The above drive units are 2 Megabytes unformatted)

Continued →

QUEST MOUSE Mk II

● Quest Mouse II & Quest Paint	£58
● Quest Mouse II, Quest Paint, AMX Stop Press & Pagefont	£89
● Quest Mouse II only	£29
● Quest Paint Software only	£34
● Quest Font Disc	£15
● Quest Mouse Mat (Red or Blue or Green please specify)	£3
● Part Exchange your unreliable AMX Mouse for a Quest Mouse for only	£22
● GXR ROM for the BBC Micro	£22

(P.S. Quest Paint is not compatible with BBC Compact)

N.B.
1. Quest Paint supplied complete with Software in a 32K ROM, Comprehensive User Guide and a Utility Disc.
2. Quest Font Disc has 22 text FONTS for use within Quest Mouse.

ConQuest

Watford's Quest package is an extremely powerful and flexible drawing package, with very wide and unusual features. However, since its launch various suggestions for even more advanced & powerful facilities were received from the Quest users. ConQuest allows you these more advanced facilities, like, distortion of a cutout to any shape and a full font designer. If you also have a GXR ROM in your machine or you are using a BBC Master then ConQuest will take advantage of this to give ellipses at any angle, sectors and arcs, etc. Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.
Some of the features are:

- *Pick filenames off the screen for loading and saving.*
- *Rotate a cutout to any angle and Distort it to any four sided shape.*
- *Has Built in Font editor.*
- *Default brushes and patterns on startup.*
- *16 x 16 font available on start up.*
- *Ability to reset patterns, fonts and brushes to default at any time.*
- *ROM based enhanced Epson and compatible printer dump.*
- *ROM based enhanced extended picture routine.*
- *Ability to create and abort extended pictures.*
- *Improved disk access speed for extended pictures.*
- *User definable sideways RAM driver for incompatible sideways RAM systems.*
- *Ellipses at any angle on Master 128 (or B with GXR ROM).*

ConQuest ROM Package	£30

(Price includes software in ROM and a comprehensive Manual).
(Not Compatible with BBC Compact)

RB2 Marconi
TRACKER BALL

RB2 (AMX/Quest compatible)	£45
RB2 including Quest Paint	£75

THE NEW Mk III AMX MOUSE

ONLY: £59 **Inc. Super Art package**
(carr £3)
(Please specify for BBC, Master or Compact)

MOUSE MAT	£3
AMX MOUSE ONLY	£29
AMX UTILITY Package	£13
AMX SUPERART Package	£34
AMX STOP PRESS – A Desktop publising software. Works with Keyboard, Joystick or a mouse	£32
PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker	£13
AMX DESIGN (ROM)	£55
AMX XAM Educational	£15
AMX EXTRA EXTRA	£16
AMX MAX A-gem of desktop (ROM)	£15

NEW

WE MOUSE HOUSE

Treat your mouse to a cosy Mouse House. This handy little gadget solves the problem of where to store your mouse when it is having a rest. Made of sturdy plastic, the WE Mouse House attaches to the side of your computer, Monitor, disc drive or desk.
It protects it from damage when not in use, yet within easy reach when you need it again. There is also a second compartment for your pens and pencils – and at £4 it doesn't cost a rodent's ransom.

Price £4

MARK II LIGHT PEN

Our Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted.

FLEET STREET EDITOR

Software pack for BBC Micro	£33
Software pack for the Master	£39
Software Pack for Compact	£40
Admin Xtra Disc Utility	£13
Walt Disney Disc Utility	£13
Fonts N Graphics Disc Utility	£13

BEEB
VIDEO DIGITISER

"Test Bureau Approved for Use in Education"

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro.

This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket.

Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem.

The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

Both the black and white levels can be adjusted manually for the optimum picture, or switched to automatic for unattended use. The image produced can be reversed if necessary.

Full controlling software is supplied on a normal sideways ROM and this is easily accessed via additional * commands. The package i designed to allow easy input of complex screens and give full access of the data to the user. Once on the screen, the image can be used as a normal graphics screen, allowing any of the usual graphics commands in BASIC or other ROMs to work on it.

A special print dump routine is included with the driver programs. This is specially designed to produce a fast, correctly proportioned picture, with reduced "contouring", resulting in an accurate reproduction of the original image.

Detailed examples of driving this unit from BASIC or other languages are all provided in the extensive manual supplied.

£109 (Carr. £5)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)
(BBC B+ and Master compatible, except Master with Econet)

Magazine Maker

(As seen on TV)
A combination of the Pagemaker and Watford's Beeb Video Digitiser.

Using any video that provides a composite signal and the digitiser, images from a camera or TV can be converted into a graphics screen on the BBC Micro.

They can then be used within Stop Press to illustrate magazines or newsletters – in fact anything that needs to be created on A4 size paper.

With Stop Press's many features, a variety of pictures can be composed – the only limit being the imagination.

Pictures can be doctored using Stop Press's graphics option to produce any number of effects.

Text can be formatted around the digitised photo on screen using the facilities available, which include 16 typefaces, character and pattern definer, text formatting and the ability to load in wordwise and viewfiles plus much more.

Once created the picture can be printed out.

The Magazine Maker is suitable for any use that requires illustrated documents.

Complete Package **£135.00** (carr. £3)

WAPPING
EDITOR
"MIGHTIER THAN THE QUILL"

The WAPPING EDITOR

Watford Electronics bring professional quality Desktop Publishing to the Beeb. By using the latest PAL technology WE have managed to cram a whopping 64K of program onto a single chip. The Wapping Editor contains ALL the software you need to get into print fast, including a very sophisticated graphics module, professional quality typesetting software with features not found on any other package in its class, a word processor which has been especially written with the DTP environment in mind and a comprehensive font editor for designing your own typefaces and headlines. It will run on the BBC B, the B+ and the Master series of computers and will take full advantage of any sideways or shadow RAM that your machine may have. It will run under DFS, ADFS and Network filing systems and requires as a minimum just a single 40 track drive.

Included with the system is a utility disc containing several high quality fonts; extra patterns for use in the graphics module; print, preview and mode convert routines and a ROM image of a Support ROM which gives even more flexibility to an already outstanding package. Amongst the many features of the Support ROM is a *"Turbo DFS"*, which is automatically selected if the Support ROM is installed. This gives DFS access times comparable with those of ADFS. The Turbo DFS is compatible with all Acorn standard Disc Filing Systems but may be disabled if required by a simple * command.

PAGE LAYOUT SECTION

The Wapping Editor may be used to create pages of any size from an A6 to a full A3 page. If none of the eight default page types suit your purpose, the stand-alone page creation program, also supplied on the utility disc, may be used to create a page to your precise requirements, to tailor-make your own Letterheads, Invoices, Complements slips etc. Together with a choice of four different densities of print-out, from a quick draft to a super-dense high-resolution dump, it is obvious that this package has true flexibility. By using fully proportionally spaced fonts and genuine microspacing it is possible to print over 150 characters across an A4 page, giving a wholly professional look to your presentations. A unique feature of the Wapping Editor is the 'A5 x 2' page size, which if used with the 'rotated printout' option, allows two A5 pages to be printed side by side onto a single A4 sheet. This greatly simplifies the task of producing booklets, newsletters, manuals etc. since the double sheets need only be collated, stapled and folded in half.

The graphics module of the Wapping Editor is a mode 0 version of the highly acclaimed Quest Paint package, incorporating all the same drawing facilities, e.g. brush, airbrush, polygon, circle, fill, cut-and-paste, etc., except in two colours and with twice the horizontal resolution. The Support ROM contains routines to allow an area to be rotated to any angle or distorted to any four-sided shape. Also included are facilities to draw ellipses at any angle and sectors, segments and arcs (in Master or BBC B with Acorn GXR).

The typesetting section will allow for justified or unjustified text, in any size font to be printed anywhere on the page. You simply specify which text document and which font you wish to use, and pull out a rectangle on the page where you want the text to be – it's as simple as that! Multiple columns may be printed just as easily and a special 'expand' feature will expand the microspacing so that the document exactly fits the space defined.

WORD-PROCESSOR

The integral full-feature word processor is the ideal tool for producing your text documents, although text can of course be read in from any of the other popular word processors such as View, Wordwise etc. This means that anyone with a word processor can contribute documents for publication but that it is not necessary to have one in order to use this package.

THE FONT EDITOR

The font editor module is an enhanced version of the one in the ConQuest ROM (see elsewhere in our advertisement for details of ConQuest). It will allow you to design your own typefaces or to modify the ones provided on the utility disc. This sophisticated editor has numerous functions including slide, flip, invert and rotate individual characters or the whole font. Single characters may be mirrored and copied and a unique 'mask' feature allows two characters to be superimposed. Lines and columns may be added or subtracted permitting characters to be stretched or squashed. Each character may be individually proportionally spaced and characters of any size up to 16 x 16 pixels may be defined.

If you already have a DTP package for your micro you will be able to use any of your existing graphics or text files from within the Wapping Editor. Even your existing fonts may be used since the font editor will convert fonts from other packages, such as Quest Paint or Stop Press (formerly Pagemaker), into Wapping Editor format. The mode conversion facility will convert any screen in modes 1,2,4 or 5 into a full grey-scale mode 0 screen, allowing graphics produced using Quest Paint, and Artist or Super Art etc., to be incorporated into the Wapping Editor. Picture may also be 'grabbed' from a video source by using the Watford BEEB Video Digitiser, either independently or from within the Wapping Editor package.

If you've been wondering which DTP system to go for, or which to upgrade to, then wonder no more, this is it. Everything has been done to make life easy, with no need for specially formatted discs or separate discs for pages, fonts, pictures etc. All types of file may be stored on the same disc, with the software intelligently and transparently distinguishing between them. Filenames are picked off the screen with the mouse, despensing with keyboard entry wherever possible.

"The Wapping Editor combines sophistications with ease of use and power with simplicity, to make it the most comprehensive and user-friendly DTP system ever likely to be written for the Beeb".

Wapping Editor Software Pack	£69
Wapping Editor plus Mouse	£89

NEW

Wapping Font Disc

Sixteen Wapping Editor fonts including smaller versions of Oberon and Daisy and two new sizes of the standard font.
Also included are three Mode 0 screens containing giant 'headline' fonts to cut and paste to create extra smooth headlines.
Supplied complete with instructions. £12

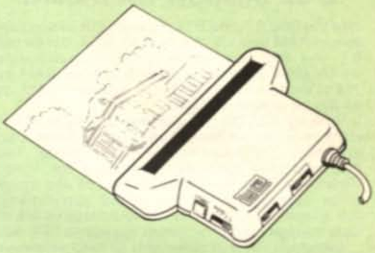
NEW

Wapping Art Disc

Over 250K of clip art to cut and paste into your Wapping Editor pages. Pictures include maps, transport, people, media, sport, games, etc. Two 'ratio' screens for use with hi-res and rotated A5 pages to ensure images are not distorted when printed out.
Music writing symbols in the form of pattern and brush for quick production of manuscripts are included together with staves.
There are two prepared hi-res pages layed out for printing labels, both single and double width. Ready made label designs are included but these can be easily replaced with your own designs.
A Mode 0 screen dump routine is also included. To pack such a large amount of data onto the discs the screens have been compressed and routines to compress and expand Mode 0 screens are included on both discs. Using the packing routines you can archive large numbers of screens onto a single disc.

£15

The Beeb HandScan Watford's Hand-held Scanner for the BBC Micro



Watford Electronics are pleased to announce the launch of the first hand held scanner for the BBC Micro. HandScan is a compact unit which will allow photographs, diagrams, or any other documents to be digitised quickly and easily, to then be used in a desk top publishing package, art program, or even in your own Basic programs! These useful devices have been available for faster and more expensive micros for some time, but only now is Watford Electronics able to offer for the BBC Micro computer.
The HandScan plugs directly into the 1MHz bus on the BBC while a comprehensive set of utilitiesis provided by the sophisticated ROM firmware. The scanner has a resolution of either 100 DPI or 200 DPI when accuracy is essential. Pictures as wide as 4" may be scanned in mode 0 and various type of dithering may be selected to simulate the grey levels of a scanned picture. All necessary software has been included in the firmware to allow the scanner to read images directly into our Wapping Editor with little more than the click of the mouse. The digitised picture may then be incorporated into your magazine, newsletter, report or any other document.

Beeb HandScan & Firmware	£135

DUMPOUT 3

A highly sophisticated screen dump ROM. This has to be the most flexible and powerful screen dump ROM yet produced for the BBC micro. It will put on paper anything you see on the screen, including full Mode 7 graphics.
Also provided are window setting utilities and OSWORD calls to plot and read Mode 7 graphics pixels.

Facilities:

- Vertical and horizontal scaling in all graphics modes and mode 7
- Rotation of image by 90, 180 or 270 degrees
- Left hand margin setting
- Screen dump window setting
- Colours appear as grey scale
- Two tone fast dump
- Colour mask
- Mode 7 contrast expansion
- Mode 7 contiguous dump
- Key triggered and User Port triggered dumps

For use with the following printers:
GLP, GP80/100/250, CANNON, STAR, KAGA/TAXAN, NEC, SHINWA CP80, GEMINI, EPSON MX/RX/FX, M1009, NEC PC8023, DMP100/200/400, Panasonic KX1081/82, Mannesman Tally and compatibles.

Only: £25

Continued →

ARIES CORNER

B-32 Shadow RAM Card

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Comal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus, Interword and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved *FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as the printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the 6502 processor socket on your BBC micro – no flying leads to connect and no soldering. Provision of the on-board ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

- Recommended by Computer Concepts for use with their Inter series of ROMs.

Price: **£69** (carr. £2)

Aries B-12 Sideways ROM Board

The B12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

The B12 system consists of two parts: a large detachable "mother board" which carries the extension ROM sockets and a small "base board" on a short ribbon cable, which plugs into the existing sideways ROM sockets.

If you do not have a B32 or B20, a small adaptor module (the Aries-B12C) is available at a nominal cost.

Price:		
Price:	Aries B-12	£36
	Aries B-12C	£5

ARIES B-488 IEEE-488 INTERFACE UNIT

The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB' or 'HP-IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

£238 (Carr £3)

VOLTMACE JOYSTICKS

Delta 3B Single Joystick	£10
Delta 3B Twin Joysticks	£15
Delta 3C Joystick for Compact	£10
Delta 14B Single Joystick	£11
Delta 14B/1 Adaptor Module	£12
Transfer Software Disc-Tape	£7

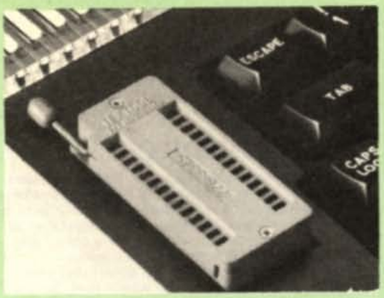
REPLICA 3

This new improved REPLICA 3 from Clares is a very powerful disc based TAPE to DISC Utility. It now transfers even more programs than ever before. Replica 3 will not work with all programs but then neither will anything else. 30,000 Replicas have been sold to date. It has to be good.

£15 (40 or 80 track)

Not compatible with 1770/DDFS.

SIDEWAYS ZIF SOCKET



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.

- The low profile of the socket allows unrestricted access to the Keyboard.

- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.

- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for all professionals and Hobbyists alike.)

- BBC, B+ and Master compatible.

ONLY **£18** (carr £3)

Low Profile CARTRIDGE SYSTEM

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack for the BBC B.

● Complete System	£11
● Spare Cartridges	£2.50
● Spare Rack	£1.50

ROM Cartridges for the BBC Master
Twin **£8;** Quad **£12**

16K DISC RAM

(16K Sideways RAM Module)

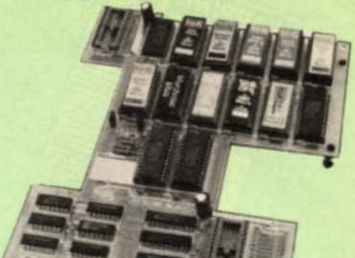
Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector.
Key points to note about this new addition to the Watford range of products are:

- Write protection (useful in a variety of circumstances).
- Compact construction.
- Supplied complete with Battery Backup.
- No overheating or overloading problems.
- Free utilities disc supplied.
- Can be used as a 16K PRINTER BUFFER.
- Ideal for professional software development.
- Supplied with utilities software disc.

Only: **£35** (carr £2)

P.S. 16K Disc Ram Board is not designed to work in conjunction with a Sideways ROM Board.

SOLDERLESS SIDEWAYS ROM SOCKET BOARD



In the May 1986 Micro User's independent review, the writer concludes, "The board has been well laid out. Its position is much better than others – not over the HOT RAM chips and further away from the disc controller area". "I give the solderless ROM board the thumbs up and wish it success".

This brand new board from Watford Electronics is designed specifically for those wishing to add a ROM board to their own BBC without the need to perform any soldering.

This new board expands the total possible number of ROMs in a BBC from 4 to 16.

Unlike our competitors inferior boards, the ONLY upgrade required for fitting battery backup to the Watford Solderless ROM board (all Watford ROM boards, actually) is the fitting of the battery itself. (No other expensive components are required.)

- The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:
- Increase your BBCs capacity for ROMs from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £35
Battery backup fitted **£39**
Battery Backup only **£3**
(carriage £2)

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

Only: £8

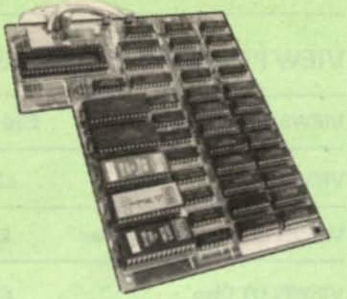
USER PORT SPLITTER UNIT

User Port Splitter
A
B

Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaniously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination.

Excellent Value at **£22** (carr £2)

ROM/RAM CARD



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 3 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO overheating problems.
- No User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Firm mounting in BBC micro.
- Compatible with all BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of Battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- Accepts any ROM.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE Fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROMSPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

Please write in for further details.

INTRODUCTORY PRICES:

- ROM/RAM card with 32k dynamic RAM ***£48***
- ROM/RAM card with 64k dynamic RAM ***£65***
- ROM/RAM card with a massive 128k dynamic RAM **£109**

(carriage on ROM-RAM Card £3)

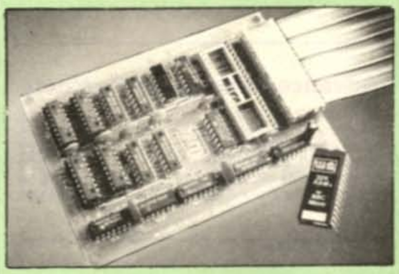
OPTIONAL EXTRAS:

- 16k plug-in Static RAM kit **£17**
- 16k Dynamic RAM for Upgrade **£17.50**
- Battery backup **£3**
- Read and Write protect switches .... **£2** each

Complete ROM-RAM board
All options installed **£115**

P.S.
Is your existing ROM Board overflowing with ROMs? Do you need more Sideways RAM? Is your Board unreliable? Then upgrade to Watford ROM/RAM Board and pay £5 less

32K
SHADOW RAM-Printer Buffer
Expansion Board



A MUST FOR WORD PROCESSING

Watford Electronics now brings you the latest state-of-the-art MEMORY EXPANSION BOARD for your BBC microcomputer. Don't throw away your BBC B for a BBC B Plus or BBC Master. Just plug the ribbon cable into the 6502 processor socket, and fit the compact board inside the computer. Immediately you will gain not 16K or even 20K, but a massive 32K of extra RAM!!!

- IMPROVE your WORD PROCESSING system, whether disc or cassette based. Don't wait for a slow printer – type in text while printing. TWO JOBS DONE SIMULTANEOUSLY and £100+ saved on a printer buffer.

- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28,000 bytes free – 5 times as much as normal.

- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24K of text in memory. This product is recommended as an ideal complement by Computer Concepts.

- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20K of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28K of program space.

- Use the FULL 32K or the bottom 12K of the expansion RAM as a PRINTER buffer for PARALLEL or SERIAL printers, sound channels, RS423 etc. Print large text files while running long graphics programs, and have all your buffer options available as well (*FX15,21,138,145,ADVAL etc). Please note only a 12K printer buffer can be used with Wordwise or Wordwise-Plus, due to the way they are written.

- Unique facility to turn ROMs off and on again. Unlike all other ROM managers, this feature does not use 'unofficial' memory. Two bytes of normally user-inaccessible memory on the RAM card are used to ensure ROMs are disabled WHERE OTHER ROMS FAIL.

- Recommended by Computer Concepts for use with their Inter series of ROMs.

Only £59 (carr £2)

(Price includes a comprehensive manual and the ROM)

INCREDIBLE WORDPROCESSING DEAL

Watford's 32K SHADOW RAM CARD and Computer Concept's INTERWORD Wordprocessor package.

at Only **£89** (carr £2)

BBC SOFTWARE'S
Popular Educational Software

● Maths with a Story 1 (Disc). 4 primary level maths programs	**£11.25**
● Maths with a Story 2 (Disc) 4 further maths programs	**£11.25**
● Picture Craft (Disc) 6 - 14 age group. Pack consists of flexible geometrical design & colouring programs	**£17**
● WAVES: Science Topics (Disc) CSC O Level Physics program.	**£14.95**
● RELATIONSHIP: Science (Disc) O Level Biology program.	**£20.00**
● BONDING: Science (Disc) O Level Chemistry program.	**£20.00**
● ELECTROMAGNETIC SPECTRUM (8 Discs) O Level program.	**£20.00**
● ELECTRONICS IN ACTION (Disc) O Level program	**£19.95**
● NEWTON & THE SPACE SHUTTLE (Disc) O Level program.	**£20**
● ECOLOGY (Disc) O Level program.	**£20**
● POLYMERS (Disc) O Level program.	**£20**
● Clasification & Periodic Table O Level. The suite is supplied with its own database of chemical elements which can be classified according to your own rule.	**£20**
● FOOD & POPULATION (Disc) O Level program.	**£20**
● MICROTECHNOLOGY (Cassette) O Level program.	**£11.25**
● A VOUS LA FRANCE (2 Cassettes) A French language home study aid.	**£21.70**
● DEUTSCH DIREKT! (Disc & Audio Cassette)	**£19.95**
● Modem Master (Disc)	**£11.25**
● ADVANCED TELETEXT SYSTEM	**£8.65**
● PERIOD TABLE SOFTWARE	**£20**
● Astronomy – Primary (Disc)	**£12**
● Computers at Work – Primary	**£17.35**
● Introducing Geography – Primary	**£17**
● **Introducing Geography 11-17yrs**	**£17.50**
● Electric Fields 6-14 years	**£11.25**
● BlackQueen Contract Bridge	**£13**
● Espana Viva – 3 Discs	**£19.95**
● A Vous La France Disc	**£21.50**

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383

Acorn's Speech Synthesiser package, complete
Special Offer £15
BBC B Micro only

Versatile **BEEB SPEECH SYNTHESISER** Unit

Beeb Speech Synthesiser

The Watford Speech Synthesiser is a very flexible speech synthesis unit based upon the powerful phonemes system. This system stores the building blocks of speech (called phonemes) and allows you to combine them quickly and easily to form virtually any word imaginable.

Supplied with an advanced ROM, you are provided with a 500 word dictionary to get you started. These can easily be added to by following the notes given in the comprehensive manual.

SPECIAL PRICE £32 (carr £2)

Continued ⟶

COMPUTER CONCEPT'S ROMS

ACCELERATOR	£30
CARETAKER Basic Utility	£23
DISC DOCTOR	£28
Graphics ROM	£29
TERMI	£25
COMMUNICATOR	£49
Printmaster	£24

Wordwise £26

Wordwise plus £40

We are giving away absolutely **FREE,** the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear text-segment area.
- BBC B, B+ and Master compatible.

Only **£24**

(N.B. Word Aid requires a Disc Interface in your Micro)

HI-WORDWISE-PLUS DISC: **£5**

SPELL MASTER **£42**

Inter SHEET **ONLY £37**

INTER CHART **ONLY: £25**

Inter-WORD **£36**

MEGA-3 ROM

Interword, Intersheet & Interchart – 3 in one ROM **£76**

INTERBASE **£49**

All Prices Exclusive of VAT

MINI OFFICE II

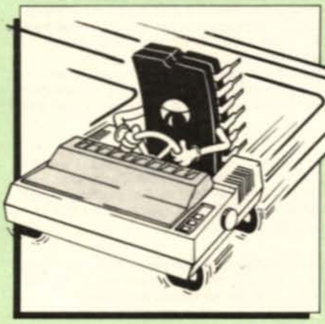
DISC Version for BBC B & B+	£14.00
DISC Version for BBC Master	£16.50
Disc Version for the Compact	£18.00

(When ordering please specify for which Micro & 40 or 80 track Disc).

Advanced Computer Products

Advanced Disc Toolkit	£30
Advanced Disc Investigator	£25
Advanced 1770 DFS BBC	£29
Advanced 1770 DFS Master	£30
Advanced File Manager	£25.00
Advanced Control Panel	£30.00

VIEW PRINTER DRIVER ROM



View is a powerful word processor, but until now has seriously lacked in terms of printer support. With the launch of our Printer Driver ROM, which includes an extremely powerful and easy to use Printer Driver Generator, View users can find themselves in the realms of advanced word processing only at a small outlay.

The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, FX, LX, JX80 range, HI80, KP810/910, PW1080, JP101, HR15, M1009, GLP, Panasonic KX-P1081/2, JUKI 6100, etc.

Other printers are readily supported by defining a Printer Driver using the built in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features).

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redefinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute * command when printing.

Other features include a very powerful on screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips. (Write in for a detailed leaflet).

Price: Only £33

VIEW WORDPROCESSOR 2.1	**£35**
VIEW 3.0 ROM	**£48**
VIEW PROFESSIONAL	**£59**
VIEWSHEET (Acornsoft)	**£36**
VIEWSTORE	**£36**
VIEWSPELL with 80 track disc	**£29**
VIEWPLOT Disc (Please specify for Master 128 or Compact)	**£20**
VIEW-INDEX	**£12**
OVERVIEW Packs 1 & 2	**£69**

Watford's own Sophisticated VIEW PRINTER DRIVERS

Epson FX80 & Kaga KP (Disc)	£8
Juki & Brother HR15 (Disc)	£8
Silver Reed Printers (Disc)	£8

OFFICE MASTER

CASHBOOK – A complete "Stand Alone" accounting software package for the cash based sole trader/partnership business. It is designed to replace your existing cashbook system and will provide you with a computerised system complete to trail balance.

FINAL ACCOUNTS – Will take data prepared by the Cashbook module and produce a complete set of accounts as following: Trial Balance with inbuilt rounding routine; Notes to the accounts; VAT Summary; Profit & Loss A/C; Balance Sheet.

MAILIST – A very versatile program. Enables you to keep records of names and addresses and then print, examine, sort and find them, all with special selection techniques.

EASILEDGER – A management aid software tool designed to run alongside an existing accounting system. Essentially a Debit/Credit ledger system which can handle sales, purchase and nominal ledger routines to provide instant management information.

INVOICES & STATEMENTS – Greatly reduces the time and cost of preparing Invoices and Statements by storing essential information like customer names, addresses and account numbers. Has VAT routines and footer messages facility.

STOCK CONTROL – Allows you to enter stock received, stock out, summary of stock items and current holdings together with details of total cost, total stock to minimum level, units in stock ordering, quantity and supplier detail.

All this for only **£21** (Disc)

OFFICE MATE

- DATABASE
- BEEBCALC SPREADSHEET
- BEEBPLOT GRAPHICS

DATABASE – Set up a computerised card index system with powerful search facilities.

SPREADSHEET – Offers many calculation and editing features.

BEEBPLOT – Provides visual representation from Spreadsheet data.

OFFICE MATE Only £10 (Disc)

BOOKS (No VAT on Books)

15 Hr Wordprocessing BBC/View	£5.95
15 Hr Wordprocessing BBC/WW & WW+	£5.95
30 Hour BASIC (BBC Micro)	£12.95
6502 Assembly Language Programming	£19.95
6502 Application	£13.95
6502 Development Package	£7.50
6502 Programming the	£16.95
6502 Reference Guide	£10.95
68000 Assembly Language	£15.95
68000 Assembly Language Prog.	£19.95
68000 Assembly Language Techniques	£24.95
68000 Machine Code Programming	£13.00
68000 Microprocessor Handbook	£14.95
68000 Programming the	£22.95
68000 User Guide	£8.95
6809, Programming the	£18.95
Advanced User Guide for BBC	£10.95
Amiga Hardware Ref Manual	£23.70
Amiga Machine Lang. Guide	£19.95
Art of Microcomputer Graphics	£16.95
Assembly Language Prog. for the BBC	£10.95
Assembly Language Quick Ref.	£21.95
AY-3-8910 Programmable Sound Generator Data Manual	£3
BASIC 2–User Guide	£2
BBC–Advanced Graphics with the	£11.75
BBC – Advanced Programming Techniques for	£8.95
BBC Basic Guide	£19.95
BBC Computer Handbook – The Complete	£14.95
BBC–Mastering Assembly Code	£8.95
BBC Micro & the small Business	£5.75
BBC Micro–File Handling On	£8.50
BBC Micro–within the	£13.95
BCPL User Guide	£14
BCPL The Language & its Compiler	£8.50
C Big Red Book of	£7.50
C-A Dabhand Guide to	£14.95
C for Programmers	£9.95
C Programming Lang. 2nd Edition	£24.95
COMAL–Introduction to	£9.50
Complete FORTH	£6.95
Computer Graphics & CAD fundamentals	£9.95
Deutsch Direkti (Book only)	£5.95
DNFS Instruction Booklet	£2
DISC FILING SYSTEM (DFS) Operating Manual for BBC	£6.95
File Handling on BBC Micro	£8.50
FORTH–Advanced	£9.95
FORTH on the BBC Micro	£9.95
Hackers Handbook - New	£6.95
Hitch-Hikers Guide to A.I.	£8.95
Introduction to COMAL	£9.50
Inside Information, Computers & Coms.	£9.95
ISO-PASCAL Reference Manual	£9.95
LISP the Language of Artificial Intelligence	£13.95
Logo on the BBC Micro	£7.50
Mysteries of DISC DRIVES and DFS REVEALED	**£5.95**
Mastering Assembly Code	£8.95
Mastering Interpreters & Compilers	£14.95
Mastering Music	£6.95
Mastering the Disc Drive	£7.95
Master 512 Guide–Dabs	£9.95
Master Operating System	£12.95
Master Reference Manual Part 1	£14.00
Master Reference Manual Part 2	£14.00
Master Reference Manual–Advanced	£19
MINI OFFICE II–A Dabhand Guide	£9.95
PASCAL–Introduction to	£17.95
PASCAL Programming	£9.45
Practical Disc File Techniques	£5.95
Sideways Ram User Guide–Advanced	£9.95
The Epson FX-KAGA PRINTER Commands REVEALED	**£5.95**
The Software Business	£5.50
Towers Int. Transistor Selectors	£14.95
Understanding Interword – A Beginners Guide	£6.50
Using DOS+ on the 1512 (95% Ok for 512 Bd)	£9.95
View 3.0 User Guide	£10
View Guide (View 2.1)	£4.50
Viewsheet & Viewstore Dabhand Guide	£12.95
Mastering View, Viewsheet & Viewstore	£12.95
VIEW Dabhand Guide	£12.95
Viewsheet User Guide	£10
Viewstore User Guide	£10
Writing Interactive Interpreters & Compilers	£8.45
Wordwise + A User Guide	£9.95
Z88 Computing	£9.95
Z88 Using Your	£9.95

Carriage on Books vary between £1 to £3.50, depending on their weight.

BOOKS for IBM PC & Compatibles

1-2-3 For Business 2nd Edition	£20.95
1-2-3 Command Language	£19.95
1-2-3 Special Edition (QUE)–Using	£21.95
8086/8088 Assembly Language Prog.	£12.45
8086/8088 Programming the	£17.95
Ability–Using	£12.95
Accountancy software in Business – Using	£12.95
Advance C Tech & Application	£19.95
Advanced Tech. in Turbo Pascal	£19.95
Aldus Pagemaker–Using	£21.45
Amstrad Basic 2 Manuals	£12.95
Amstrad Technical Manual for 1640	£19.95
Amstrad PC Programmers Ref Guide	£7.50
Amstrad PC1512-1640 Step by Step – Using	£8.50
Amstrad PC 1512/1640–Using 2nd Ed.	£9.95
Amstrad PC 1512 PC User Guide – 2nd Ed	£9.95
Autocad–Using Release 10	£26.95
Business companion on the 1640	£12.95
dBase II & III–Understanding	£7.95
dBase II–Working with	£9.95
dBase III–Mastering	£21.95
dBase III Plus	£12.95
dBase III Plus–Complete Reference	£19.95
dBase III Plus–Mastering	£21.95
dBase III Plus Handbook 2nd Edition	£20.95
dBase III Plus – tips, tricks and traps (QUE)	£20.45
dBase III Plus–Quick Ref. Guide	£4.95
dBase III Plus–Quick Prog. Guide	£8.95
dBase Instant Reference (III & III+)	£10.95
dBase IV – Handbook £19.95	
dBase 4–Understanding	£22.95
DOS Instant Reference (up to 3.3)	£10.95
DOS, Mastering for Versions up to 3.3	£19.95
DOS Power Tools (includes a disk)	£39.95
DOS Plus Manual/Amstrad PC	£10.95
DOS–Programmers Ref. Manual	£22.95
Excel IBM Version–Using the	£22.95
Good Software Guide – for IBM PCs and Compatibles	£19.95
Hard Disc Instant Reference	£10.95
Hard Disk Manage IBM PC XT AT	£17.35
Hard Disc–Managing your 2nd Ed.	£20.95
Hard Disc management – Quick Reference Guide to	£4.95
IBM PS/2 Handbook	£19.95
IBM PC AT–Inside the	£20.95
Local Area Networks 2nd Generation	£19.95
Lotus 1-2-3 Desktop Companion Soft/B	£24.95
Lotus 1-2-3–Illustrated	£18.45
Mastering 1-2-3 2nd Edition	£19.95
MS-DOS–ABC's of	£16.95
MS-DOS Advanced Programming	£20.95
MS-DOS Handbook 3rd Edition	£18.95
MS-DOS Instant Reference Guide	£10.95
MS/PC DOS 3.3–Illustrated	£18.45
MS-DOS Masters–Tricks of	£22.50
MS-DOS Performance Programming Under	£18.95
MS-DOS Quick Prog Ref Guide	£8.95
MS-DOS Commands – Quick Reference Guide	£4.95
MS-DOS–Running 4th edition	£21.95
MS-DOS–Supercharging 2nd Edition	£17.95
MS-DOS Users Guide 3rd Edition	£20.95
MS-DOS–Using	£19.95
Operating the IBM PC Network	£18.45
Pagemaker–Desktop Publishing	£15.95
Pagemaker IBM PC–Mastering	£18.95
Pagemaker IBM version–Using 2nd Ed	£22.95
Pagemaker–Illustrated	£18.45
Pagemaker on IBM PC–Using	£24.95
Programming Guide to EGA & VGA Cards	£23.95
Prog. Guide to IBM–P. Norton's	£19.95
Quattro–Mastering	£21.95
Smart–Using	£21.45
Smart–tips, tricks and traps (QUE)	£22.45
SuperCalc 4–Mastering	£19.95
SuperCalc 4–Using	£21.45
Symphony 4th Edition–Mastering	£24.95
The Good Software Guide – for IBM PCs and Compatibles	£19.95
Turbo Pascal Advanced Tech	£18.95
Turbo Pascal Complete Ver. 4.0	£21.45
Turbo Pascal Program Library	£18.95
Upgrading & Repairing PC's	£22.95
Using DOS+ on the 1512 (95% OK for 512 Ed)	£9.95
Using Microsoft WORD 2nd Edition	£19.95
Using Pagemaker on the IBM PC	£22.45
Ventura–Mastering	£21.95
Ventura Publishing–Instant incl. DISC	£34.75
Ventura Tips + Tricks	£18.95
Wordperfect 5–Desk Top Companion	£2.95
Wordperfect Desktop Companion	£20.95
Wordperfect–Illustrated	£18.45
Wordperfect 3rd Ed–Using	£19.95
Wordperfect Made Easy	£15.95
Wordstar & CP/M made easy	£10.95
WordStar Release 5.0–Mastering	£19.95
WordStar 1512/1640–Using	£9.95
WordStar User's Ref. manual	£12.50
Wordstar–Quick program Ref. Guide	£8.95
WordStar 4.0–Using 2nd Edition	£18.45
Xerox Ventura–Desktop Publishing	£14.50
Xerox Ventura Publishing–Inside	£18.45

The Advanced Reference Manual for the BBC Master

At last Acorn's long awaited Advance Reference Manual for the BBC Master Series of Microcomputers has now been published. Watford Electronics' own authors have edited and added missing sections to the original script and produced a very high quality publication.

It features information about:

- Memory Organisation
- Slow data bus
- Detailed circuit description
- Keyboard controller
- Screen display
- User port
- Serial Processor
- Peripheral bus controller
- 1 Mhz Bus
- Machine operating System
- Second processors – Internal, Z80 and 80186
- Disc Filing Systems
- ANFS
- Terminal Emulator & Editor
- View internal format
- Detailed differences between Model B, B+, Master 128K and Compact
- Comprehensive appendix on 65C12 instruction set

At the rear of the manual there are pull out circuit diagrams for the Master 128K.
A worth-while addition to any Master owner's library.

All this for just £17 (NO VAT)

NEW

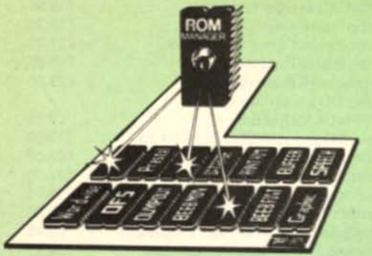
The Complete Mouse User Guide to BBC Micro

This manual has been written to reveal the secrets of the mouse. It explains all the principles required by the hardware and associated software, and also example listings for inclusion into custom programs. The manual first details the basic principles of the mouse and a simple program which uses these principles. This information should be adequate for most applications. However, it is possible to improve the performance of the mouse by expanding on the principles already used in the software. This is again fully explained and an example program given.
It is possible to gain a full understanding of the mouse from this manual. For those not interested in exactly how the mouse functions, complete example programs are also included. These may be typed directly into the micro, without the need for any understanding of the hardware or software involved, enabling the mouse to be used for custom applications.

Price £5.95 (No VAT)
Example programs on Disc £4.95

Continued →

ROM MANAGER

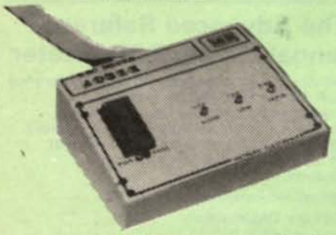


Take control of your Sideways ROMs with ROM Manager. This powerful utility ROM gives you power over your sideways ROMs. Disable whole ROMs, send commands directly to named ROMs and many other powerful facilities.

"Provides comprehensive management of all your installed ROMs". (BEEBUG November '84.)

ONLY £20

ADDER



The only low cost EPROM Programmer for the BBC Micro that will program both the standard 21V and the new 12V5, 27128 EPROMS.

Adder is the ultimate EPROM programmer for the BBC Micro. It will program many different EPROMs up to the very latest 27256 32K devices.

The Adder unit connects to the User Port and draws its power from there too. The EPROM is mounted in a top quality ZIF socket. There are no switches or controls as Adder is entirely software controlled.

The Adder software provides sophisticated facilities for programming EPROMs from a RAM image produced by loading disc files. The software is menu driven and designed for ease of use.

Features:

- Two ultra fast programming algorithms or standard slow algorithm.
- Supports standard 21V programming and newer 12.5 volt EPROMs. (Software switched).
- The RAM image to be programmed can be built up in many ways. Sections of image can be loaded separately. Part programming. Read EPROM. Edit data in memory.
- Automatic processing to handle a list of files to program into the EPROM.
- Automatic disc buffering to allow programming of 32K 27256 devices from a 32K file without extra effort.
- Verification gives detailed error list and checksums are maintained. There is also a blank check facility.
- Works with all standard filing systems. Generates header code for RFS ROMs to allow Basic programs etc. to be stored in EPROM. More than one file per ROM permitted.
- Programs the following EPROMs: From 2K to 32K: 2516, 2716, 2532, 2732, 2764, 2764A, 27128, 27128A, 27256 (Both 12.5V and 21V).

£65 (£5 Carr)

TEX EPROM ERASERS

EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs! The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast. We use these erasers for all our own erasing work.

- **ERASER EB** – Standard version erases up to 16 chips. **£28** (carr £2)
- **ERASER GT** – Deluxe version erases up to 18 chips. Has automatic safety cut-off to switch off the UV lamp when opened. **£30** (carr £2)
- Spare UV tubes. **£9**

Servisol Foam Cleaner

This 415Ml, king size multi-purpose foam cleaner spray is ideal for cleaning the Keyboard, Monitor, Disc Drive and your computer furniture surfaces. Simply spray on the surface to clean and wipe off with a clean cloth.

£2.50

SPARES for BBC Micro

BBC Keyboard	**£42**	Speaker	**£2**
Master Keyboard	**£62**	Keyswitch	**£1.50**
UHF Modulator	**£4**	16MHz Crystal	**£4**
Speaker Grill	**£1**	32.768MHz Xtal	**£1.00**
Power Supply	**£56**	Master PSU	**£59**
BBC Casing	**£20**		

Replacement FLEXIBLE 17 way Keyboard Connector £4

Antistatic Aerosol Spray

Ideal for cleaning and preventing static build-up on TV/Monitor Screens.

£2.50

Aerosol Dust Spray

Aerosol Dust Spray

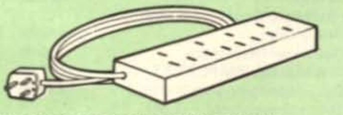
This simple to use aerosol spray is ideal for removing Dust and Dirt deposits from the Keyboards and similar inaccessible places. **£3**

SURGE PROTECTOR Plug

Fitted in place of your normal mains plug, this device protects your equipment against mains surges. Nearby lightning strikes, thermostats switching and many other sources which put high voltage transient spikes on to the mains. This can lead to data corruption in memory and on disc and can result in spuriously crashing machines. A must for every computer user.

Protection for only **£8.50**

4 WAY MAINS DISTRIBUTION SOCKET



4 way top quality mains trailing sockets. Supplied wired up with mains plug ready for use. Can be screwed to floor or wall if required. Very useful for tidying up all the mains leads from your peripherals.

£8.65 (carr £1.50)

ARIES SPIKE CLEANER UNIT

A 4 way mains distribution unit as above with a built-in Surge Arrester, providing protection for your complete computer system

£13.50 (carr. £1.50)

ROM EXTRACTION TOOL

This extremely useful tool allows you trouble free chip insertion and removal from your computer by distributing the removal force over the whole body of any 24 or 28 pin chip. **£2**

28pin DIL HEADER PLUG

SOLDER type **£1.50**; IDC CRIMP type **£1.95**

8 WAY DIP SWITCH

Increase the speed of your Disc Drives by soldering this switch to your BBC B or B+ Keyboard.

Only **£1.00**

28 pin ZIF SOCKET (Textool) £6.95

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383

CONNECTING LEADS

(All ready made and tested)

CASSETTE LEADS 7 pin DIN Plug	
to 3 pin DIN Plug + 1 Jack Plug	**£2.50**
to 7 pin DIN Plug	**£3.00**
to 3 Jack Plugs	**£2.50**
6 pin DIN to 6 pin DIN Plug (RGB)	**£3.00**

DISC DRIVE POWER LEADS

Supply from BBC power supply to standard Disc Drive connector.

Single **£3.00** Dual **£3.75**

DISC DRIVE INTERFACE LEADS

BBC to Disc Drives Ribbon Cable

Single **£4** Twin **£6**

Miscellaneous Connectors

	Plugs	Sockets
RGB (6 PIN DIN)	**50p**	**75p**
RS423 (5 pin Domino)	**70p**	**80p**
Cassette (7 pin DIN)	**40p**	**95p**
ECONET (5 pin DIN)	**35p**	**50p**
Paddles (15 pin 'D')	**150p**	**250p**
Disc Drive Plug 4 way	**100p**	–
6 way Power Connector	**120p**	**150p**

Watford DATA DUCK

Convert two single Disc Drives into one Dual Drive with this simple external unit (Suitable for Disc Drives with PSU. For Disc Drives without PSU, you will also require Watford Power Duck, see below).

£14

Watford POWER DUCK £8

CHIP SHOP

DS3691	**£4.50**
DS88LS120	**£5.25**
LM324	**£0.45**
SN76489	**£5.50**
SAA5050	**£8.75**
UPD7002	**£6.00**
2764-250nS	**£2.80**
27128A-250nS (12V5)	**£3.00**
27128-250nS (21V)	**£5.25**
27256-2	**£3.99**
27512-2	**£7.99**
27C101G (1 Meg)	**£13.95**
4013	**60p**
4020	**£0.90**
4164-15	**£3.25**
4464-12	**£8.95**
4464-15	**£8.25**
4816 RAM	**£2.00**
41256-15	**£8.25**
41256-12	**£9.75**
6264LP-8K	**£6.00**
6502A CPU	**£4.50**
65C02 3M	**£9.75**
65C12	**£9.00**
6512A	**£10.00**
6522	**£3.40**
6522A	**£4.50**
62256ALS-15	**£12.50**
6818	**£4.00**
6845SP	**£6.00**
68B50	**£2.95**
68B54	**£7.50**
7438	**40p**
74LS00	**25p**
74LS04	**25p**
74LS10	**25p**
74LS123	**80p**
74LS163	**70p**
74LS244	**80p**
74LS245	**£1.00**
74ALS245	**£2.75**
74LS373	**£1.00**
74LS393	**£1.00**
75453	**70p**
75159	**£2.00**
8271	**£39**
9637	**£2.00**
ICL7673PA	**£2.00**

ASSORTED ROMS

ACORN ADFS	**£25**
ACORN BASIC 2 plus User Guide	**£22**
Acorn BCPL	**£42**
Acorn COMAL	**£38**
ACORN DNFS	**£17**
Acorn FORTH	**£32**
Acorn Graphics	**£25**
Acornsoft C Disc	**£45**
Acorn LISP	**£19**
Acorn LOGO	**£42**
Acorn OS B+	**£25**
Acorn OS 1.2	**£14**
Basic Editor	**£24**
BBC PCB Designer	**£49**
Beebfont	**£25**
Beebmon	**£22**
Buffer & Backup	**£20**
Communicator	**£49**
Commstar II	**£28**
EPSON NLQ ROM	**£25**
Graphics Extension Rom	
GXR-B	**£21**
GXR-B+	**£22**
ISO Pascal	**£51**
ISO-Pascal Stand Alone Generator	**£30**
ICON Master	**£28**
Logotron LOGO	**£39**
Master OS ROM	**£38**
Master Termulator	**£32**
Micro Prolog	**£62**
Microtext Disc	**£46**
Microtext Rom	**£199**
NLQ DESIGNER	**£25**
Pendown ROM	**£29**
ROMIT	**£29**
Serial ULA	**£13**
TED	**£35**
Termulator B, B+	**£25**
Termulator Master	**£32**
Video ULA	**£14**
ULTRACALC II	**£26**
1Mb OS ROM	**£39**

Now for a touch of FINESSE when you choose an Aries PC from Watford

FREE... Hardware and Software worth £300, with every Aries PC System purchased from us

The Aries IBM PC-XT 88 and Aries PC AT286 compatibles are now supplied with Digital Research's GEM, the powerful Finesse 1.1, Desk Top Publishing package and Multiwriter WORDPROCESSING software, (in addition to PC Organiser, MSDOS and 12 months on site maintenance warranty). So not only you get the best all round value in PC compatibles, but you also get a complete and powerful WYSIWYG DTP software package that takes you from typewritten text onto typeset quality layouts. LOGITEK MOUSE too is included with the package. P.S. To operate Finesse DTP, you require a Hard disc system.

WATFORD GIVES YOU MORE FOR YOUR MONEY.

ARIES PC-XT 88

Specification:

- 16 Bit Intel 8088-2 or NEC V20 78108 microprocessor, running at 8MHz or 4.77MHz. (3 times faster than IBM PC/XT).
- 8087-2 maths co-processor, optional.
- 640K minimum expandable to 1024K on system board, extra 384K RAMDISK available.
- 360K Single Floppy (optional 2nd Floppy/3.5"/20MB Winny/T. Streamer).
- CLOCK on System board, gives non stop DATE & TIME.
- 8 expansion slots.
- RS232 with two ports.
- Microsoft MS DOS 3.30.
- 102 keys keyboard.
- 150W power supply.
- GW-BASIC 3.21.
- Mono graphics/parallel card.
- Legal BIOS and built in games port and clock.

ARIES PC AT286

Specification:

- 80286 microprocessor.
- Optional 80287 Maths co-processor
- 640K RAM standard expandable on-board to 4MB.
- 1.2M Single Floppy (optional 2nd Floppy/3.5"/Winny/T. Streamer)
- CLOCK on System board, gives non stop DATE & TIME.
- 8 expansion slots.
- Serial/Parallel Card.
- Switchable Speed 8/12M Landmark test at 16MHz.
- Microsoft MS DOS 3.30.
- 102 key keyboard.
- HDD/FDD Card.
- 200W power supply.
- GW-BASIC 3.21.
- Mono graphics/parallel card (Herc. Compt.)
- Slide in metal case with function display.
- Legal BIOS and built in games port and clock.

FREE 12 month On-site Maintenance warranty (UK mainland) included in the price

Available in the following configurations:

- ***System 1** – Aries PC-XT 88 Basic System including FREE Bundled Software & Hardware* **£445**
- ***System 2** – Aries PC-XT 88 system 1 as above plus 14" hi-res monochrome Flat Screen monitor* **£489**
- ***System 3** – Aries PC-XT 88 System 2 as above plus a 720K 3.5" Disc Drive fitted* **£579**
- ***System 4** – Aries PC-XT 88 System 2 plus a 20MB Hard Disk fitted* **£799**
- ***System 5** – Aries PC-XT 88 System 2 plus a 40MB Hard Disk fitted* **£849**
- **System 6** – Aries PC-XT 88/EGA hi-res Colour System, Aries EGA Monitor/EGA Card and 40MB Hard Drive fitted. **£999**
- **System 7** – Aries PC-XT 88 System 5 plus Ultra High Res VGA/Multisync Colour Monitor & Card plus 40MB Hard Disc Drive fitted **£1149**

Available in the following configurations:

- ***System 1** – Aries PC-AT 286 Basic System including FREE Bundled Software & Hardware* **£759**
- ***System 2** – Aries PC-AT 286 system 1 as above plus 14" hi-res monochrome Flat Screen monitor* **£799**
- ***System 3** – Aries PC-AT 286 System 2 as above plus a 720K 3.5" Disc Drive fitted* **£889**
- ***System 4** – Aries PC-AT 286 System 2 plus a 20MB Hard Disk fitted* **£995**
- ***System 5** – Aries PC-AT 286 System 2 plus a 40MB Hard Disk fitted* **£1199**
- **System 6** – Aries PC-AT 286 / EGA hi-res Colour System, Aries EGA Monitor/EGA Card & 40MB Hard Drive fitted. **£1399**
- **System 7** – Aries PC-AT 286, Ultra High Res VGA/ Multisync Colour Monitor & Card plus 40MB Hard Disc Drive fitted **£1499**

If you want a different combination, we will be pleased to configure a system to your specific requirement. Please telephone our PC department for price.

Prices subject to change without notice and available on request. ALL OFFERS subject to availibility.
Mail Order and RETAIL SHOP. Trade and Export inquiries welcome.
Government and Educational Establishments' OFFICIAL ORDERS Accepted.
Shop Hours: 9.00am to 6.00pm. Monday to Saturday. Thursdays 9am to 8pm. (Free Customer's Car Park)

VAT: UK customers please add 15% VAT to cost incl. Carriage.
CARRIAGE: Unless stated otherwise, minimum £1.50 on all orders. £3 on Larger items. On bulkier items, £7 Securicor charge applies (UK mainland only). Overseas orders, carriage is charged at cost.

Specifications of all products are given in good faith but is subject to change without notice. Some items vary in their availability. Please ring for latest delivery situation.

Watford Electronics

JESSA HOUSE, 250 Lower High Street,
WATFORD WD1 2AN, ENGLAND
Telephone: (0923) 37774; Telex: 8956095;
FAX: 01 950 8989

ORDER VIA microLink 72:MAG030

NOW FOR RISC OS

A LOW COST DISC BASED

PROFESSIONAL ACCOUNTING PROGRAM

"MICRO-TRADER"

INTEGRATED SALES PURCHASE AND NOMINAL LEDGERS

Turn any BBC Computer from the humble Model B to the latest Archimedes into a fast, powerful business tool. 'Micro-Trader' can provide easy to use and timesaving computer accounts for businesses with a turnover up to £21 million per year.

Designed for business use by a business man. "Micro-Trader" offers full Sales and Purchase Ledger facilities including SALES INVOICE and STATEMENT PRINTING with a capacity of up to 1,000 accounts and 5,000 transactions per month.

Nominal Ledger featurea quick and easy entry of everyday transactions. Up to 6 Bank Accounts, full V.A.T. facilities, Journal Posting. Full Reporting for individual accounts, Audit Trail, Trial Balance, Profit & Loss and Balance Sheet.

ONLY £200 + V.A.T.

"MICRO-STOCK"

Stock Control program, fully integrated with "Micro-Trader". 4,000 Stock Items with user defined Codes. Invoice and Credit Notes and Cash Sales routine. Full Stock Held Reports.

£75.00 + V.A.T.

"EXTENDED PAYROLL"

Micro-Aid Full Feature Extended Payroll. For use stand alone or integrated with "Micro-Trader"

£49.95 + V.A.T.

"MICRO-MAILER"

A Mailmerge program, fully integrated with "Micro-Trader". With a user Database.

£30.00 + V.A.T.

ARCHIMEDES

Improved program for RISC OS features faster searches, larger capacity and improved analysis facilities.

Archimedes

PHONE TODAY FOR A FREE FACT SHEET

MEADOW COMPUTERS

11, LONDON STREET, WHITCHURCH, HAMPSHIRE, RG28 7LH

Telephone: Whitchurch (0256) 892008

We offer a unique inspection copy service

NOW RISC OS COMPATIBLE

ARCHWAY

Have you spent long hours struggling with the programming complexities of the brilliant Archimedes **WIMPS** system?

YOU can easily and quickly build multi-window programs for Archimedes with pop-up menus, icons, mouse control, etc. of a professional quality. All in BBC Basic. With RISC OS your programs are multi-tasking and installed on the icon bar.

ARCHWAY provides a total environment for programming with **tools, run-time** code, program **shells**, extensive **examples** and a **library** of functions and procedures.

The **tools** let you define and edit windows, multi-level menus, icons, mouse pointers and much more. The cut, copy and paste, undo, on-line help and hard copy print-out facilities give you power as well as ease of use and convenience.

The **run-time** code becomes part of any program you create. It automatically handles windows, menus, icons, etc. for you. For example, opening a window can involve little more than calling a function with the window's name. Attach a menu name to a window using the tools and the menu functions without you writing a line of code. Give a menu item a command name and when a user chooses it a function in your code with the same name is called. You just write the contents of the function.

An in-depth user guide takes you gently step-by-step through a progressive series of program building examples. All examples are on disc ready to run.

£79.95
incl. VAT & p/p

The complete system comes on 4"800k discs (3 tools & 1 run-time) with a 300+ page, ring-bound user guide. You need 1M of RAM to run the tools. One disc drive is sufficient. No extra licence fee to distribute copies of the run-time in your programs.

AVAILABLE SOON: A Major New Release (VI. 1). Many new features; eg powerful graphics and text facilities for your programs by multitasking cooperation with the RISC OS Draw, Edit and Paint programs. **BUY ARCHWAY NOW AND UPGRADE WITHOUT FURTHER CHARGE!**

SIMTRON *Programs to help you*

4 CLARENCE DRIVE, EAST GRINSTEAD,
WEST SUSSEX RH19 4RZ Telephone (0342) 328188

Cheques/POs/official orders or Access/Visa number and expiry date. 24-hour 'phone for Credit Card orders.

Access VISA

CSH

EDUCATIONAL SOFTWARE

SIMULATIONS, ADVENTURES AND UTILITIES FOR AGES 5 TO ADULT

For Model B, M128, Compact & Archimedes

Write or telephone for our fully detailed catalogue

Trade enquiries welcome

CAMBRIDGESHIRE SOFTWARE HOUSE
The Town Hall, St. Ives, Huntingdon, Cambs. PE17 4AL
Tel: 0480-67945

MULTIPORT BUFFERS WITH 2 PRINTER PORTS

BOTH PRINTERS PRINTING DIFFERENT DOCUMENTS SIMULTANEOUSLY, SOFTWARE & MANUAL PRINTER SELECT, MULTIPLE COPY FUNCTION, SIMULTANEOUS DATA INPUT, AUTO SELECT.

WITH SOFTWARE PRINTER SELECT FACILITY

CENTRONICS

PB12-S(64K) £269(d) • 1 INPUT & 2 OUTPUT WITH 64K BUFFER & EXPANDABLE TO 256K.
PB22-S £295(d) • 2 INPUT & 2 OUTPUT WITH 256K BUFFER & EXPANDABLE UP TO 1MB.
PB42-S £415(d) • 4 INPUT & 2 OUTPUT WITH 256K BUFFER (NOT EXPANDABLE)
PB82-S £755(e) • 8 INPUT & 2 OUTPUT WITH 256K BUFFER & EXPANDABLE UP TO 1MB. NEW

SERIAL

SB22-S £375(d) • 2 INPUT & 2 OUTPUT WITH 256K BUFFER & EXPANDABLE UP TO 1MB.
SB42-S £495(d) • 4 INPUT & 2 OUTPUT WITH 256K BUFFER (NOT EXPANDABLE
S31P-SP £520(d) NEW 3 SERIAL & 1 PARELLEL INPUT WITH 1 SERIAL & 1 PARALLEL OUTPUT & 256K
2S2P-PP £495 • 2 SERIAL & 2 PARALLEL INPUT WITH 2 PARALLEL OUTPUT & 256K NEW

WITHOUT SOFTWARE PRINTER SELECT FACILITY

PB42-WS £365(d) • 4 INPUT & 2 OUTPUT WITH 256K BUFFER & EXPANDABLE UP TO 1MB.
PB62-WS £545(e) • 6 INPUT & 2 PUTPUT WITH 256K BUFFER & EXPANDABLE UP TO 1MB. NEW

SB62-WS £655(e) • 6 INPUT & 2 OUTPUT WITH 256K BUFFER & EXPANDABLE UP TO 1MB. NEW

CENTRONICS & SERIAL 256K MEMORY EXPANSION D RAM £80

MULTIPORT BUFFERS WITH 1 PRINTER PORT

PB21 £265(d) • 2 INPUT & 1 OUTPUT WITH 256K BUFFER & EXPANDABLE UP TO 512K. NEW
PB41 £340(d) • 4 INPUT & 1 OUTPUT WITH 256K BUFFER & EXPANDABLE UP TO 1MB.
PB71 £545(e) • 7 INPUT & 1 OUTPUT WITH 256K BUFFER & EXPANDABLE UP TO 1MB.

SB31 £375(d) • 3 INPUT & 1 OUTPUT WITH 256K BUFFER & EXPANDABLE UP TO 512K.
SB71 £655(e) • 7 INPUT & 1 OUTPUT WITH 256K BUFFER & EXPANDABLE UP TO 1MB.
UB64 £190(d) • 1 SERIAL & 1 PARALLEL INPUT WITH 1 SERIAL & 1 PARALLEL OUTPUT WITH 64K & EXPANDABLE TO 256K.

SMART AUTOMATIC SWITCHES

Model	Connector	No of Input	No of Output	Price	Model	Connector	No of Input	No of Output	Price
IPS2A	PARALLEL	2	1	£100(c)	V24-2A	SERIAL	2	1	£130(c)
IPS4A	PARALLEL	4	1	£130(d)	V24-4A	SERIAL	4	1	£160(d)
IPS8A	PARALLEL	8	1	£170(e)	V24-8A	SERIAL	8	1	£200(e)
IPXA	PARALLEL	2	2	£145(d)	V24-22A	SERIAL	2	2	£155(d)
APS42A(WS)	CENTRONICS	4	2	£165(d)	V24-42A(WS)	SERIAL	4	2	£175(d)
IPS42A(S)	PARALLEL	4	2	£195(d)	V24-42A(S)	SERIAL	4	2	£210(d)

(S) = PRINTER SELECTED BY SOFTWARE (WS) = WITHOUT SOFTWARE CONTROL

Add postage: (a) £2.00 (b) £4.50 (c) £5.50 (d) £6.50 (e) £8.50 + Cables £1.00 each + 15% VAT

keyzone

KEYZONE COMPUTER PRODUCTS LTD
454 Sunleigh Road, Alperton, Wembley,
Middlesex HA0 4NW. (England)
Telephone: 01-900 1525 (4 lines) Telex: 8813271 GECOMS G Fax: 01-903 1486

VISA Access

Lights, camera, action!

Steve Bruntlett animates his frames into a movie

Product: Film-Maker
Price: £79.95
Supplier: Silicon Vision Ltd, Signal House, Lyon Road, Harrow, Middlesex HA1 2AG.
Tel: 01-422 2274

NOT content with SolidCAD's ability to produce excellent three dimensional images using various surface fill methods, Silicon Vision has moved on to the fascinating area of moving graphics. Its new graphics package enables three dimensional scenes or objects created with SolidCAD – reviewed in the June issue of *The Micro User* – or Realtime Solids Modeller to be animated into an independently running film.

The review copy I received consisted of the Film-Maker program, demonstration discs and an 83 page A4 provisional manual. Silicon Vision describe it as *a program which provides an interactive environment to create animated sequences of three dimensional scenes with dynamic motion for walk throughs and flight paths for objects within the scene.*

In essence Film-Maker is a user-friendly implementation and extension of Silicon Vision's Realtime Graphics Language for people who don't want to get involved in programming but who wish to work interactively so that they can see exactly what they're producing at each stage.

The software can produce and record a set of frames which when made into a film, show a flight through complex three dimensional scenes. The sequence can be animated as fast as a frame a second, which is not as fast as conventional animation, but is nevertheless very impressive – even without considering the amount of information being processed.

Animated scenes can be stepped through and previewed so that you're always sure what the result is going to be like before finalising it. A number of frames can then be stored on a separate disc as a film which can be played-back at video scan rates for onscreen animation or video recording.

The demonstration disc shows to good effect the flight path through one of the three dimensional scenes provided on the disc.

The key concept of the system is what Silicon Vision describes as the Path, which represents movement through three dimensional space as if you were flying a plane through or around the scene or object. Paths are used to control the motion of the camera and the centre of interest, in other words where the camera is and what it's looking at.

The camera can be aimed at a fixed spot within the scene or directly ahead, which can give some wonderful fly through effects, but may just produce a lot of blank space. Not only can you fly around the scene, you can preplan the camera movements to follow an independent path, or select objects to be animated independently along their own flight paths. Paths are defined and edited with Film-Maker, but the program can't be used to design three dimensional solids themselves.

The manual is well laid out and the sequence it follows through the descriptions of the package's features is well illustrated with numerous sequences of screen dumps.

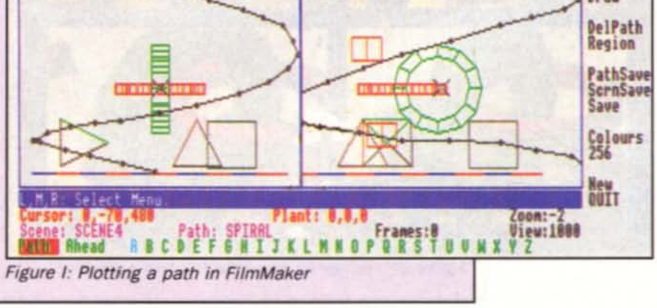
When you run Film-Maker a similar screen to that of SolidCAD is presented. The screen comprises four viewports – side and front elevation, plan and projection. The right-hand side of the screen is occupied by a menu of the options and sub-options – see Figure I.

The viewports in SolidCAD are used to aid the process of drawing three dimensional objects. In Film-Maker, they are used to draw and edit paths. By working in the plan, side and front elevation viewports, a good representation of a path in three dimensions may be produced and the resulting view of the camera can be seen in the projection viewport.

Drawing a path is achieved by positioning successive points or nodes along the route using the mouse buttons. Nodes can be moved, added or deleted at any stage. As you move the cursor, a red rubberbanded line is drawn between the first node and successive positions. Paths can be saved to disc or deleted if you want to restart.

The camera's centre of interest can be moved

Turn to Page 100 ▶



L.M.R: Select Menu.
Cursor: 0,-70,400 Plant: 0,0,0 Zoom:-2
Scene: SCENE4 Path: SPIRAL Frames:0 View:1000

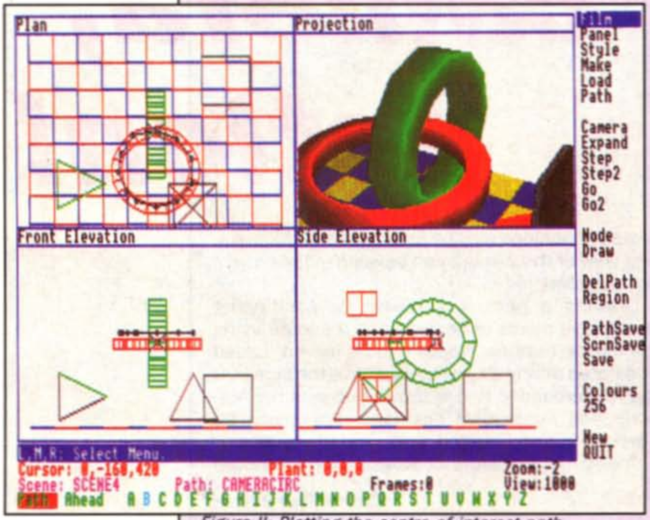
Figure I: Plotting a path in FilmMaker

◄ From Page 99

to any point in the scene as can the camera position, but there are other options. The camera's centre of interest can be set to ahead, which gives the view you would have if you were flying a plane. But the most powerful option is that of defining a path for the centre of interest which is independent of the camera's.

Dynamic scene movement involves tagging regions of a scene or individual objects which can then be assigned to a path and animated independently of the rest of the objects within the scene.

Path interpolation sounds really complicated, but it only involves splitting up a path into a number of equal steps which are independent of the number of nodes. While a dozen nodes may be sufficient to plot a path, they may not give a particularly smooth flight. To make the animation smoother, a larger number of frames than the number of nodes is used. The only thing to bear in mind is how many frames you can load into memory from an animation disc for independent animation.



```
L,M,R: Select Menu.
Cursor: 0,-160,420          Plant: 0,0,0          Zoom:-2
Scene: SCENE4     Path: CAMERACIRC     Frames:0   View:1000
```

Figure II: Plotting the centre of interest path

The stand alone generator allows you to run the animation independently from Film-Maker as a film. The Make menu allows you to preview the animation by enlarging the projection viewport to full screen size and constructing the film frame by frame.

Image resolution can be changed from high to medium if you want to use more frames. The delta option is chosen to construct and save the frames on to the disc to be used for the animation. The last option – install – copies the necessary files for running the film to the animation disc.

Film-Maker looks fairly straightforward, so I spent some time trying to animate a scene supplied on the disc using a variety of path files. I started by loading SCENE4, selecting 256 colours and the shade option to get smooth colour shading. I also set the zoom to -2 so that the whole scene was in view. Drawing a path is uncomplicated once you get used to controlling the cursor helped by the plan, side and front elevations. The nodes can be moved if necessary, extras added and surplus ones deleted. The whole path can also be moved in any direction.

Using path A, I drew a slope for the camera path going from the bottom left-hand corner to the top right-hand corner of the front elevation. Then with path B, I drew a circle above the red horizontal taurus in the scene for the camera centre of interest to follow. This is shown in Figure II.

Paths A and B are restricted to the camera and centre of interest paths. Paths C to Z are for tagged regions or objects only. Though I managed to go through the tutorial on tagging in the manual successfully, I couldn't get the tagged object paths working alongside the camera and centre of interest paths. It may have been too complicated when made into a film, but the tagging option does work – it just needs a bit of time and patience to get used to.

The resulting film looked impressive even though it was a bit short, although the pause between each frame can be adjusted. The main problem was that because Mode 15 was used, only about 30 frames could be loaded into memory. This means that if you want long smooth animations in high resolution you need more memory than 310 can provide. Figure III shows a sequence of scenes from the film.

There is no doubt that Film-Maker greatly extends the usefulness of the 3D scenes or objects created by SolidCAD or the Realtime Solids Modeller.

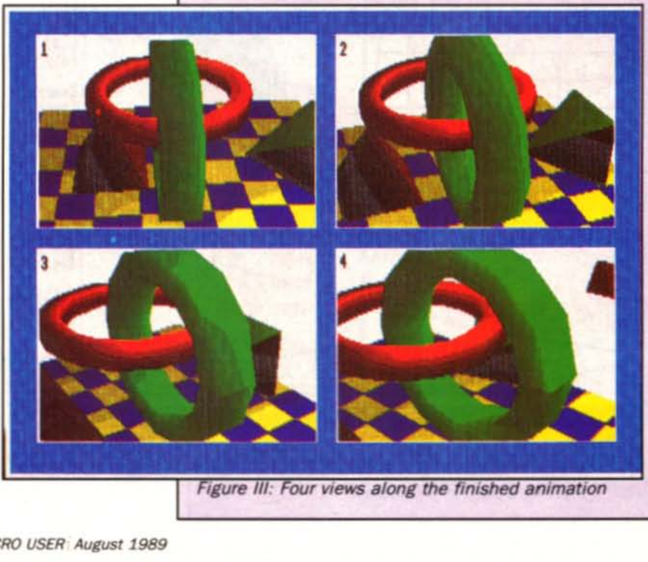
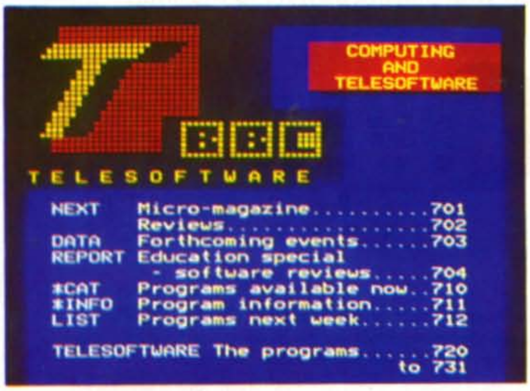


Figure III: Four views along the finished animation

SUMMING UP

Film-Maker is a very useful extension to SolidCAD, allowing you to experiment with three dimensional animation, but whether it's worth £79.95 depends on how much you need to animate your existing scenes.

Obtain FREE software at any time with this teletext receiver



```
                         COMPUTING
                            AND
                        TELESOFTWARE

            BBC
TELESOFTWARE

NEXT     Micro-magazine..........701
         Reviews.................702
DATA     Forthcoming events......703
REPORT   Education special
          - software reviews.....704
*CAT     Programs available now..710
*INFO    Program information.....711
LIST     Programs next week......712

TELESOFTWARE The programs........720
                                to 731
```

With the Morley Teletext Adapter you can download software whenever you like at no charge whatsoever. Programs are updated every week and range from educational and utility software to exciting games.

You'll also be joining the 3.5 million households who regularly access the thousands of pages on Ceefax, Oracle and 4-Tel to check programme details, football results, share prices, up-to-the-minute news bulletins and much more.

The Morley Teletext Adapter is the most popular unit on the market with more than 10,000 satisfied customers – including the Department of Transport who use it to display weather maps at service stations throughout the country. It plugs straight into the user port, includes menu-driven software and automatically tunes itself to the required channel.

You'll be able to store pages in memory, use the real-time clock in your programs and automatically load associated pages each time you select a page from the menu – considerably speeding up access time.

The Morley Teletext Adapter is an ideal companion for your BBC Micro system.

Note: If you use your BBC Micro's auxilliary power socket for your disc drive, or any other external device, you will need a power supply which we can provide for an additional £9.95.

MORLEY ELECTRONICS
TELETEXT ADAPTER SUPPORT ROM
User Guide
MORLEY ELECTRONICS
Advanced Teletext System
USER GUIDE
MORLEY ELECTRONICS

SAVE £27!

Look what you get!

- Stylish beige teletext unit
- Official BBC Advanced Teletext rom
- Utilities disc packed with programs to help you make the most of your receiver

NORMAL PRICE

£127

SPECIAL OFFER PRICE

£99.95

including VAT and p&p

FREE!

When you order a Morley Teletext Adapter you will also receive a FREE gift of Morley's Design 7 Plus Mode 7 editor, worth nearly £10.

IMPORTANT: The BBC points out that a teletext adapter, like a TV set, will not work satisfactorily without a good outside aerial. Nor will it function correctly if you experience reception problems such as ghosting. They emphasise that these problems only affect a few areas of the country. However if you have any doubts as to the quality of signal available in your area you should contact the BBC Technical Support Service during office hours on 01-927 5040.

To order please use the form on Page 119

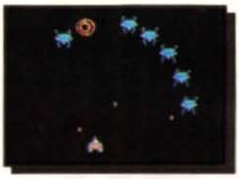
CLARES ARCADE GAMES

Some real classics from Clares, "Arcade 3" and "Overload". Pit your wits against Mega Monsters, defeat Deadly Invasions, push your playing powers to the limit.

ARCADE GAMES 3 COMPILATION

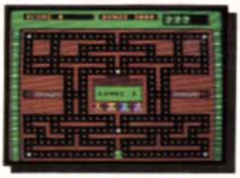
This three-in-one combination will tie you to your computer terminal for hours.

First, there's an invasion by the Evil Aliens (they're always doing that sort of thing). You are a star cadet. Can you save Zarkon from a grizzly and gruesome fate?



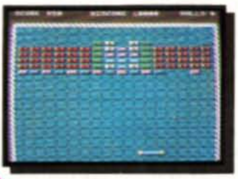
ZARKON INVASION

And here's a hungry little game, Mazey Man. He's feeling peckish but so are the guards, it's eat or be eaten in this gastronomic maze game.



MAZEY MAN

Bounce-A-Ball's fun, that is if you're not a brick. Because bricks get broken in this colourful and complex game, smash the colourful bricks, but can you be as quick as the ball?



BOUNCE • A • BALL

Arcade Three, three tests of skill and ingenuity from Clares.

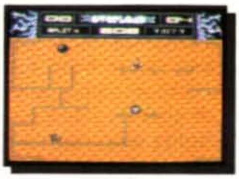
£14.95

OVERLOAD

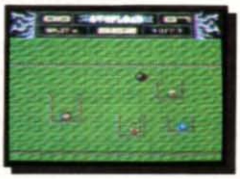
THE MEGA MONSTER EXPERIENCE

It's a mega-monster experience. Why? Well it's all Igor's fault you see. He created a whole host of video nasties after booby trapping Frank 'n' Stein's interstellar cell phone.

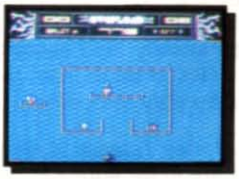
As a fitting reward for this dastardly deed, Igor is sentenced to life imprisonment in a spheroid. But spheroids being the dull places they are, drive Igor to suicide, and the trouble is, the nasties are still on the loose.



Here's where you come in, you are Cheetah, Igor's 11 legged flea. Your job, sort out those evil slime balls! It's not as easy as it looks, however, Frank 'n' Stein's set up a little sabotage of his own and the nasties must now die in the correct order.



And if that isn't bad enough, there's a time limit too. Squash the nasties in the wrong order or exceed the time limit and you could end up... well, it's just too horrible to write about.



£14.95

Clares have done it again.
These games will test your skills, patience and dexterity to the limit.

RISC OS COMPATIBLE

CLARES
MICRO SUPPLIES

98 Middlewich Road, Rudheath, Northwich, CHESHIRE CW9 7DA.
Telephone: 0606 48511 Fax No: 0606 48512

Think big, move fast

You can use sideways ram to hold overlays for use in that really big program. H.R. Wall explains how

THE main difficulty with writing really substantial programs for the BBC Micro is the lack of space, particularly in high resolution modes. Using overlays is a tried and tested system and is usually disc-based, but here's a method that utilises sideways ram. A program using overlays keeps all frequently called routines – like string input or sound output – in a core program along with the overlay handling procedures.

Subject-based routines – file handling, editing, printing and so on – are held independently in files and only loaded when needed.

The usual method is to keep the independent files on disc but this has two disadvantages: There is a considerable waiting period while an overlay is being loaded and a lot of wear and tear on the disc drive.

A better way is to store the overlays in sideways ram to make them instantly available – and silent in operation. The demonstration programs and explanations which follow show how this can be done.

Ideally each overlay will avoid calling another, but there can be cases where this is not practicable. For example, your problem may be that the program is one that adds data progressively and has eventually taken up all ram space. You can then either move the data to sideways ram – a ploy which can get complex and is best avoided – or free ram space for data storage by using overlays.

If the latter is decided on the program will already be written and established, so may be badly structured. If a complete rewrite is to be avoided in modifying it for overlays, you may have to accept that some overlays will call others. This means making calls at more than one level. The way this can be done is described later.

Enter Listing I, ensure you have made no typing errors using the checksums, and save it as *OvlDemo*. You can try running it but you'll get a *Channel* error in the initialisation routine because the overlay files don't exist yet. Now enter Listings II to V saving them in the O directory as O.OL1 to O.OL4.

Now *CHAIN"OvlDemo"* and the output should look like this:

```
Overlay 1 > A
Overlay 2 > B
Overlay 3 > C
Overlay 4 > D
```

If you list the program you'll find that only the core program is present. Now issue a GOTO70 command – and, magically, you get the same output again.

How is it done? The initialisation routine

Turn to Page 104 ▶

Compatibility

The technique illustrated here will work on the Master series, B+128 and fully *Masterised* model Bs.

WRITING OVERLAY PROGRAMS

When working from scratch it's quite easy to decide how to divide your program. But whether you're programming anew or converting an existing routine it's worth drawing an inverted tree structure to show what overlays are needed and to what level:

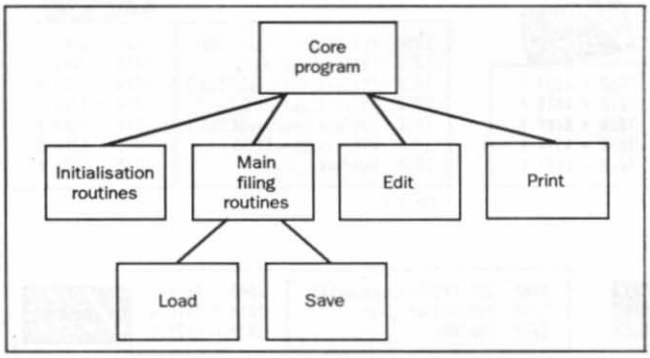


Figure II: Overlay structure of a standard program

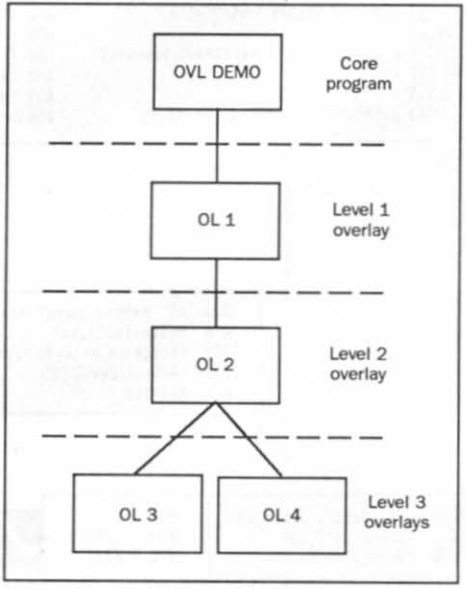


Figure I: Overlay structure of demo programs

◀ *From Page 103*

prepares the banks of sideways ram to receive data, reads in the names of each overlay file in turn, then:

- Saves the name of the file.
- Saves the next free position in ram – which is where this overlay starts.
- Finds out and saves its length.
- Loads it into sideways ram.
- Updates the next free position pointer. The level one pointer – *ovl1%* – points to the top of the core program.

When PROCget_overlay1 is invoked the array containing the list of names is checked to see which one is required. It is then loaded in at level one – just above the main program – and the new top of the program is set in *ovl2%*. The procedure in it is then called.

The same operation is carried out for level two and three overlays – only the variables used are different. Overlay two illustrates how one routine can overwrite another, and all the routines call PROCprint which is located in the core program.

Three levels of overlay can be called and executed although for most purposes – particularly purpose written software – only one will be needed. It is essential that overlays are called in consecutive and ascending order of level starting.

So there you have it – the key to enter the world of really big programs with very little loss of speed.

```
   10 REM Sideways Ram overlay demo
   20 REM by H.R.Wall
   30 REM (c) The Micro User
   40 MODE7
   50 LOMEM=TOP+&2000
   60 PROCinit_overlays
   70 ON ERROR PROCerror:END
   80 PROCget_overlay1("OL1")
   90 PROCovl_demo1("A")
  100 PROCquit:END
  110 :
  120 DEFPROCinit_overlays
  130 FOR X%=ASC"W" TO ASC"Z"
  140 PROCcli("SRDATA "+CHR$X%):NEXT
  150 READ numOvls%,ovl_path$
  160 ovl_base%=0:DIM ovl$(numOvls%)
  170 DIM ovl%(numOvls%),oln%(numOvls%)
  180 FOR O%=0 TO numOvls%-1:READ ovl$
  190 PROCload_overlay(ovl$,O%):NEXT
  200 ovl1%=TOP-2:ovl2%=-1:ovl3%=-1
  210 ENDPROC
  220 :
  230 DATA 4,"$.O"
  240 DATA OL1,OL2,OL3,OL4
  250 :
  260 DEFPROCload_overlay(o$,O%)
  270 ovl$(O%)=o$:ovl%(O%)=ovl_base%
  280 LOCAL F%,L%:o$=ovl_path$+"."+o$
  290 F%=OPENIN(o$):L%=EXT#F%:CLOSE#F%
  300 PROCcli("SRLOAD "+o$+" "+STR$~ovl_
base%)
  310 oln%(O%)=L%:ovl_base%=ovl_base%+L%
  320 ENDPROC
  330 :
  340 DEFPROCcli($&700):LOCAL X%,Y%
  350 Y%=7:CALL&FFF7:ENDPROC
  360 :
  370 DEF PROCerror:PROCquit
  380 REPORT:PRINT" at line ";ERL
  390 ENDPROC
  400 :
  410 DEF PROCquit
  420 !ovl1%=&FF0D
  430 ENDPROC
  440 :
  450 DEFPROCget_overlay1(o$)
  460 LOCAL O%:O%=FNfind_overlay(o$)
  470 PROCcli("SRREAD "+STR$~ovl1%+"+"+S
TR$~oln%(O%)+" "+STR$~ovl%(O%))
  480 ovl2%=ovl1%+oln%(O%)-2:ENDPROC
  490 :
  500 DEFFNfind_overlay(o$)LOCALO%:O%=-1
  510 REPEATO%=O%+1:UNTILo$=ovl$(O%):=O%
  520 :
  530 DEFPROCget_overlay2(o$)
  540 LOCAL O%:O%=FNfind_overlay(o$)
  550 PROCcli("SRREAD "+STR$~ovl2%+"+"+S
TR$~oln%(O%)+" "+STR$~ovl%(O%))
  560 ovl3%=ovl2%+oln%(O%)-2:ENDPROC
  570 :
  580 DEFPROCget_overlay3(o$)
  590 LOCAL O%:O%=FNfind_overlay(o$)
  600 PROCcli("SRREAD "+STR$~ovl3%+"+"+S
TR$~oln%(O%)+" "+STR$~ovl%(O%))
  610 ENDPROC
  620 :
  630 DEFPROCprint(X%,M$)
  640 PRINT"Overlay ";X%" > "M$
  650 PRINT:ENDPROC
  660 :
```

Listing I

Get it right!

```
 10 =    0 0     340 =  85E C
 20 =    0 0     350 = 50E0 1
 30 =    0 0     360 = 9719 8
 40 = 8AFC C     370 = 3327 4
 50 = 3D6A 6     380 = 6BDF 0
 60 = 4BCF C     390 = ED0F A
 70 = 917E 1     400 = 9719 E
 80 = 1DFC 8     410 = 6D21 4
 90 = D244 5     420 = B03F 6
100 = C88B B     430 = ED0F 7
110 = 9719 7     440 = 9719 9
120 = 6955 5     450 = FC1C C
130 = C16B D     460 = 8667 0
140 = 2AAF B     470 = 698D 4
150 = 8EA4 F     480 = C4B4 2
160 =  1C7 5     490 = 9719 0
170 = 284D 6     500 =  EBF 6
180 = 5853 C     510 = 2A77 C
190 = D2F7 1     520 = 9719 2
200 = 556A 2     530 = 12CE E
210 = ED0F 9     540 = 8667 8
220 = 9719 6     550 = EFC8 B
230 = EED0 3     560 = F267 5
240 = FB2C 1     570 = 9719 5
250 = 9719 5     580 = B89F 7
260 = 5C1D 7     590 = 8667 F
270 = F39F 7     600 = 6214 9
280 = F6D4 0     610 = ED0F F
290 = BC90 5     620 = 9719 9
300 = 8E06 1     630 = BFCF 9
310 = 510A 6     640 = 1A94 B
320 = ED0F 4     650 = D333 D
330 = 9719 8     660 = 9719 5
```

Get it right!

```
1000  DEF PROCovl_demo1(A$)
1010  PROCprint(1,A$)
1020  PROCget_overlay2("OL2")
1030  PROCovl_demo2("B")
1040  ENDPROC
```

```
1000 = 6531 1
1010 = 4DE8 7
1020 = 8CD9 9
1030 = 45F4 9
1040 = ED0F C
```

Listing II

Get it right!

```
2000  DEF PROCovl_demo2(B$)
2010  PROCprint(2,B$)
2020  PROCget_overlay3("OL3")
2030  PROCovl_demo3("C")
2040  PROCget_overlay3("OL4")
2050  PROCovl_demo3("D")
2060  ENDPROC
```

```
2000 = D2B3 3
2010 = FA6A 6
2020 = FC3A 8
2030 = 3764 8
2040 = 79AA B
2050 = B2F4 3
2060 = ED0F 8
```

Listing III

```
3000  DEF PROCovl_demo3(C$)
3010  PROCprint(3,C$)
3020  ENDPROC
```

```
3000 = 4FD2 2
3010 = 670B 9
3020 = ED0F 7
```

Get it right!

Listing IV

```
3000  DEF PROCovl_demo4(D$)
3010  PROCprint(4,D$)
3020  ENDPROC
```

```
3000 = AD96 6
3010 = 854F 4
3020 = ED0F 1
```

Get it right!

Listing V

B B+ M

An ear on your screen

Jeremy Brayshaw lets his micro keep track of ever changing teletext pages

HAVE you ever been following the world snooker championships on TV when someone else wants to watch something else? Or tried to monitor a changing news story on Ceefax, or perhaps the share prices? The problem is that you can waste a lot of time staring at a teletext page waiting for it to change – and if you do something else you run the risk of missing what you were after.

What's needed is a program that will display the required page but only inform you – with a beep perhaps – if it is changed. This means you can get on with something else until you're notified that there's something of interest to view. Here's just such a routine.

The first step of selecting and displaying a page appears easy – until you try the *DISPLAY function on early versions of ATS: It doesn't work after a *DATA command. Let's start by looking at the reason why.

Teletext broadcasts follow the world system teletext code and so transmit the page link information – row 27 – at the top of the page. This allows the decoder to be interpreting the encoded page link settings contained in this packet at the same time as receiving the rest of the page information.

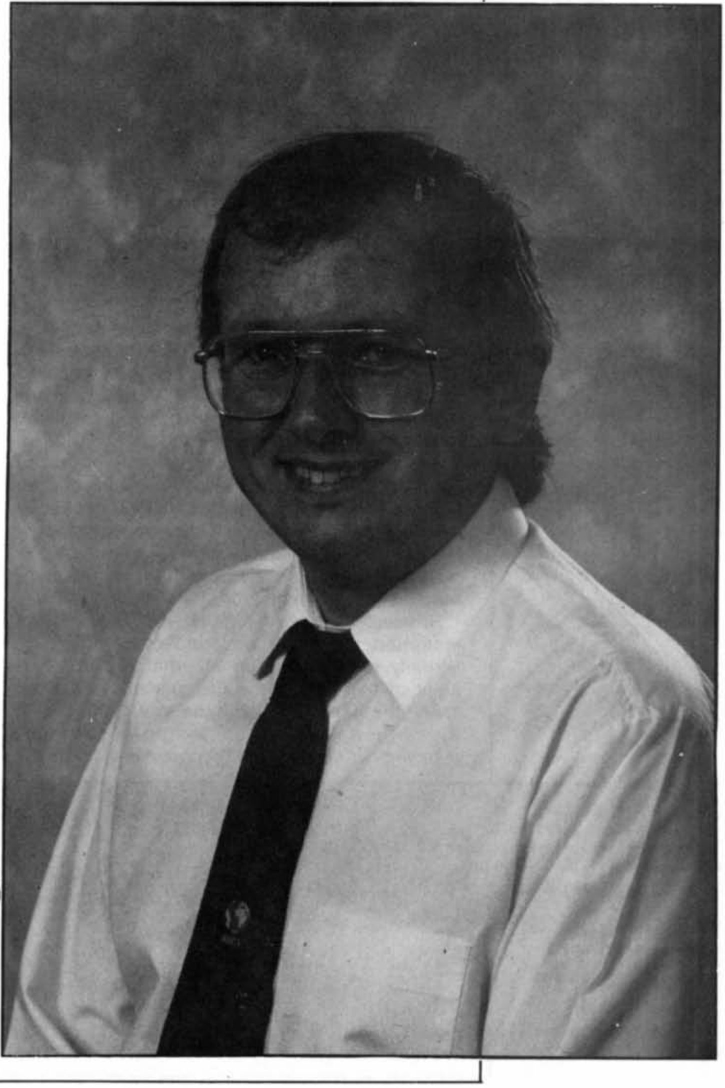
The theory is that by the time the whole page has been received – about one tenth of a second – the receiver will have interpreted the links, so it can all be displayed together. The only problem is that the ATS *DISPLAY routine takes a packet 27 as being the last row of the page, and anything after this is ignored – with the result that the page it displays appears completely blank.

The answer is to write a routine to perform the same function as *DISPLAY in Basic. The result – PROCscreen(s%) – is slow but achieves the correct result. For optimum performance the program detects which adaptor and version of ATS

Turn to Page 106 ▶

Jeremy Brayshaw is manager of the BBC's Telesoftware service, a part of the Ceefax teletext system. His first interest in teletext was as an enthusiastic user of the service who discovered the immense potential of linking a micro to the Ceefax broadcasts an addictive fascination.

He is now responsible for the various Ceefax teletext computing services, bringing the versatility and power of teletext to a rapidly increasing number of computer users in homes, schools and businesses throughout the country.

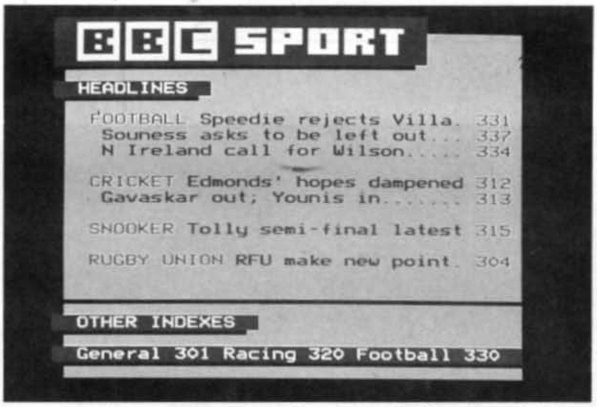


◀ *From Page 105*

are in use, then either performs a *DISPLAY if it can, or a PROCscreen if the Acorn ATS 2.50 or 2.58 or Morley ATS 2.59 are found. All have the same bug, whereas the problem does not exist in ATS 3.00 or GIS ATS+.

Having displayed the page, how can you tell whether it is different from its last broadcast or not? Storing a page and comparing it, byte by byte, to its subsequent transmission is a tedious, slow and memory-consuming process – particularly if several sub-pages exist.

However, each broadcast page includes a CRC – cyclic redundancy check – byte so that receivers can verify the page as being an accurate copy of that transmitted. The CRC is calculated by the Ceefax computers before broadcast and inserted into the last two bytes of row 27. Hence the need for the *DATA command – which transfers this with the page – rather than the *TRANSFER command, which does not.



BBC SPORT

HEADLINES

FOOTBALL Speedie rejects Villa. 331
Souness asks to be left out... 337
N Ireland call for Wilson..... 334

CRICKET Edmonds' hopes dampened 312
Gavaskar out; Younis in....... 313

SNOOKER Tolly semi-final latest 315

RUGBY UNION RFU make new point. 304

OTHER INDEXES

General 301 Racing 320 Football 330

Keeping track of results with Update

The micro performs its own CRC calculations when the page is received, and this is compared to the broadcast CRC value. If the two are identical the page has been received correctly, otherwise an error has occurred.

Storing just the CRC byte of the page, as opposed to all the data, saves enormous chunks of memory and time. When a subsequent page is received its CRC value can be compared to that of the previous page and, if different, some alteration somewhere on the page has been made – which is just the indicator I needed.

However, what if the different CRC is a result of reception problems, as opposed to the data actually changing? After all, that is the whole point of the CRC in the first place. Well, if we check the page CRC using the routines provided with ATS we will find if the page has been received correctly. If not, then we must ignore the possibility of the page having been updated in this instance, and wait for an uncorrupted page to be received. The routine FNcheckCRC(store%) carries out the page data integrity check.

Oracle, however, has a problem with CRCs on any sub-pages where the page number is displayed on screen in the form 2/4 and so on. This results in the transmitted CRC always being wrong, so the micro cannot tell whether it has received the page incorrectly or not, and always assumes the former. The program will not register any updates on such pages. ITV seems to have noticed this problem and rarely adds such page numbering to its sub-pages now.

If the selected page is part of a rolling set – a group of different sub-pages on the same main page number – the CRC will be different with every sub-page broadcast. The program must be able to detect whether the received page is a different sub-page from within the rolling set or is, in fact, a different version of the same sub-page. The function FNsubpage(store%) finds the transmitted sub-page number of the received page.

The specification states that if this is set to &3F7F or 0, then it is the only page – a static one – transmitted on that number. However, it is not unknown for ITV to broadcast a sub-page 0 as part of a rolling set. For the purposes of this program, however, this is not important. FNsubpage returns the actual sub-page number, as encoded in the non-displayed portion of the top row and not the editorial one as shown on the screen in the form 3/4. The latter is only included at the discretion of the service editors and is not always very accurate.

It is also rather useful to display on the screen the time the latest update took place. This is done by the procedure FNtime, which gets the current time from the TSDP – television service data packet – which is more accurate and reliable than looking at the last few bytes of the page header row.

All that remains is for the micro to make a noise if it finds the page has been updated. A very simple alarm call is included, but you may prefer to replace the routines in PROCsound to something of your own creation.

Adding the procedure PROCgetpage, which allows you to select pages other than the snooker scores – or even a different channel – makes the program a versatile and useful routine to keep you updated on current scores, news stories and so on, yet allows you to concentrate on other things in the meantime.

So if you're a news hound, a cricket enthusiast, have an interest in the latest share prices or want to keep abreast of any other regularly changing data from Ceefax or Oracle, let Update monitor the teletext output while you get on with other things.

```
   10 REM Update
   20 REM by Jeremy Brayshaw
   30 REM (c) The Micro User
   40 :
   50 ONERRORGOTO1340
   60 MODE7
   70 PROCheading
   80 PROCsetvars
   90 PROCgetpage
  100 REPEAT
  110 PROCfindpag
  120 PROCdisplaypage(store%)
  130 PROCupdate
  140 UNTILFALSE
  150 :
  160 DEFPROCgetpage
  170 INPUTTAB(2,11)"_Which channel? (1-
4):"ch%
  180 IFch%<1 OR ch%>4 PRINTTAB(2,11)SPC
40:GOTO170
  190 PROCoscli("CH"+STR$(ch%))
  200 *HON
  210 ONERRORGOTO1320
  220 INPUTTAB(11,13)"_Which page?:"page
%
  230 IFpage%<100 OR page%>799 PRINTTAB(
11,13)SPC40:GOTO220
  240 PROCoscli("MAGAZINE "+LEFT$(STR$(p
age%),1))
  250 CLS:PROCheading:PRINTTAB(2,11)"_Wa
iting for page ";page%;" ...";
  260 ats%=FNatsversion
```

Turn to Page 121 ▶

Is your mouse as creative as ours?

SoundSynth
Studio 24 Plus
Creations
HandiMusic
Scorewriter PMS
VuMusic
RhythmBox
Symphony

Archimedes Software

Archimedes Hardware

Midi 4 - 64 chan
Midi 2 - 32 chan
Sampler 8
Midilink
SMPTE - MINI

Click - Record - Click - Play - Click - Score!
Click - Sample - Click - Edit - Click -
Video - Click - Digitise - Click - Create!

Electromusic Research Ltd, 14 Mount Close, Wickford,
Essex SS11 8HG. Tel:0702 335747 Fax:0702 431076

---

contex

Archimedes is a trademark of Acorn Computers Ltd

BANK MANAGER *for disc systems only*

The most advanced and versatile personal bank account management program available for all BBC computers. Consistently acclaimed!

"data entry is a delight. . . professional. . . excellent product" –Micro User *April '86*

Enter cheques and receipts. Standing orders any frequency. Automatic date sequencing. Reconcile statements. Search, amend and delete. Unreconcile. Move forwards or backwards. Analyse expenditure. Forward cash flow forecast. Up to 36 simultaneous 'bank accounts' online, inter-account transfers, 9999 standing orders, 99 analysis categories. 12 actual and 12 budgets per category, over 4,000 postings on an 80tk disc. Reports to screen or printer. Graphics. Foreign currency support. Password. File recovery. Auto exec file. Field editing. Itemised look ahead. Programmable report writer.

Standard Bank Manager for the BBC B, B+ £17.50

BANK MANAGER MASTER *for disc systems only*

Includes all of the facilities of the Standard Bank Manager **plus** ADFS file system support, shadow screens, uses sideways RAM, 40 or 80 column screen reports. Improved graphics, m/c windows, function key support and onscreen labels, additional functions added to the already extensive report facilities.

Bank Manager Master for the MASTER and MASTER COMPACT £22.50

ARCHIMEDES BANK MANAGER

All facilities of Master version plus high speed 'native' mode, wild card analysis enquiry, analysis code sort and other enhancements.

"Impressed, ideal, easy to use."–Micro User, *March '88*

Archimedes Bank Manager £25.00

BANK MANAGER BUSINESS UTILITIES *for disc systems only*

For the 'professional' who also uses the BANK MANAGER to control the business accounts the BUSINESS UTILITIES add double entry trial balance and programmable spreadsheet analysis reports. Generated from cheque and cash transactions keyed into BANK MANAGER. Just pass the reports to your accountant! Available for all BANK MANAGER versions state which.

Bank Manager Business Utility Pack 1 £12.00

TYPING TUTOR

Quickly learn to touch type. Over 90 smoothly graded lessons graduate you from the basic home keys to complete keyboard mastery. Unique word scan line checking. Target WPM and percentage correct. Revise the targets or lessons as required. Audio key click for positive key depression. Establish a typing rhythm using the automatic metronone. Free format option. Disc version includes several enhancements e.g. on screen keyboard, exact mode, on screen parameters. Recommended.

Cassette £12.50, Disc for BBC B, B+, Master and Compact £12.50
Disc for Archimedes (all models) £15.00

ALL PRICES FULLY INCLUSIVE FREE POSTAGE WITHIN UK
Enquiries and Access Credit card orders telephone 0234-838347
Please state: cassette, 3.5" disc, 5.25" 40tk disc, or 5.25" 80tk disc
and computer type (B. Compact, Master or Archimedes).

CONTEX COMPUTING

(REF. MU)

15 WOODLANDS CLOSE, COPLE, BEDFORD MK44 3UE

MICRO MEDIA Computer Supplies Ltd.

ALL PRICES INC. OF DELIVERY AND VAT – ALL PRICES INC. OF DELIVERY AND VAT

5¼ Unbranded Discs

Price per	25	50	100	250
SS/DD	8.90	14.90	26.88	61.90
DS/40T	9.90	15.90	27.88	63.00
DS/80T	10.90	17.90	32.96	73.50
DS/HD PCAT's	23.90	39.90	73.88	173.20

5¼ Colour Discs (5 colours)

Price per	25	50	100	250
DS/40T	12.45	23.56	38.92	89.20
DS/80T	13.45	25.94	46.20	97.50

5¼ Reversible

Price per	25	50	100	250
DS/40 & 80T	14.50	26.94	49.48	107.20

Price per	10	20	50	100
3½ DS	10.90	20.94	46.15	86.00

5¼ MICRO MEDIA Brand Discs

Price per	10	20	50	100
SS/DD	5.75	10.90	25.50	46.50
DS/40T	6.75	12.74	29.85	57.20
DS/80T	8.50	15.96	36.25	71.30
DS/HD PCAT's	14.50	27.90	66.50	127.20
Reversible	8.50	15.96	36.25	71.30

All discs supplied are with labels 5¼" write protects, envelopes & hub rings. 100% certified error free. Lifetime guarantee

3½ MICRO MEDIA Brand Discs

Price per	10	20	50	100
DS 135TPI	14.15	27.30	64.80	124.00
DS HD 2MB	36.90	70.60	167.95	311.50

Printer Ribbons

Price each Ribbon	2	6	12
Canon 1080/1156	2.99	2.85	2.60
R, BL, GR, BR, Y	3.99	3.85	3.70
Centronics GLP	3.65	3.45	3.15
R, BL, GR, BR, Y	4.65	4.40	4.00
Citizen 120D/LSP10	3.60	3.40	3.25
Epson M,F & RX80, F & LX800	2.99	2.75	2.55
R, BL, GR, BR	4.35	4.20	4.05
Epson LX80/86 GX80	2.80	2.65	2.40
R, BL, GR, BR, Y	3.80	3.65	3.40
Juki 6100 MS	2.85	2.70	2.60
R, BL, BR	2.95	2.80	2.70
Kaga KP810/910	2.99	2.85	2.60
R, BL, GR, BR, Y	3.99	3.85	3.70
NEC P2200	4.95	4.60	4.25
Panasonic KXP1080/1/2/3	3.99	3.80	3.60
R, BL, GR, BR	6.50	6.20	5.85
Shinwa CP80MS	3.99	3.80	3.60
Star NL10	4.95	4.60	4.25
R, BL, GR, BR	6.15	5.85	5.55
Star LC10	3.50	3.10	2.85
R, BL, GR, BR	4.90	4.60	4.25
Star LC24-10	3.99	3.80	3.60

Please mix colours and types for best prices.
R = Red, BL = Blue, GR = Green, BR = Brown, Y = Yellow

If the ribbon you require is not listed please let us quote.

Computer Paper

Plain fanfold, micro perf edges

Size	Weight gsm	1000's per bx	Price per box 1 box	3 bxs	5 bxs
11x9½	60	2000	14.95	14.45	13.65
11x9½	70	2000	18.45	16.05	15.15
11x9½	80	2000	20.25	18.55	16.45
A4 11⅔x9¼	70	2000	20.95	19.70	18.45
A4 11⅔x9¼	80	2000	24.55	23.05	20.15
A4 11⅔x9¼	90	1000	14.25	13.15	14.15

Computer Labels

Continuous fanfold, sprocket fed

Price per 1000	1000	3000	5000
70 x 36 2¾x1⁷⁄₁₆	4.85	3.85	3.55
89 x 36 3½x1⁷⁄₁₆	5.35	4.50	4.10
89 x 49 3½x1¹⁵⁄₁₆	6.60	5.90	5.40

Please state no of labels across sheet (1, 2 or 3)

Disc Storage Boxes

Price each	1+	3+	6+
MD 120 5¼ x 120	9.95	8.95	7.60
MD 100 5¼ x 100	8.90	7.99	7.40
MD 50 5¼ x 50	6.10	5.65	4.80
MD 80 3½ x 80	8.90	7.99	7.40
MD 180 5¼ x 180	19.90	18.90	17.95
MD 150 3½ x 150	20.95	19.25	18.90

Printer Stands

	Price each		
PS10 80 col	28.50	27.25	25.30
Wire 80 col	11.10	9.90	8.95

Swivel Bases

	Price each		
12" 55 x 280 x 260 mm	11.90	10.40	9.60
14" 55 x 355 x 320 mm	13.50	11.80	10.90

ALL PRICES INC. OF DELIVERY AND VAT

HOW TO ORDER

BY PHONE

VISA

LEICESTER 0533 856622
OUT OF OFFICE HOURS 0533 858654

BY POST (NO STAMP REQUIRED)
MICRO MEDIA, DEPT. MU,
FREEPOST
LEICESTER LE3 6ZQ

BY FAX LEICESTER 0533 858932

PERSONAL CALLERS LEICESTER – SORRY NO PERSONAL CALLERS

POTTERS BAR – PERSONAL CALLERS WELCOME – MICRO MEDIA,
Rydal Mount, Baker St., Potters Bar, Herts.
Mon to Fri 10.00am - 4.00pm

OFFICE HOURS Leic. Mon to Fri 8.30am - 6.30pm

DESPATCH WITHIN 24 HRS
DELIVERY PLEASE ALLOW 5 DAYS

For guaranteed next day delivery please phone – from £2.50 EXTRA. Postage covers UK only.

MINIMUM ORDER VALUE

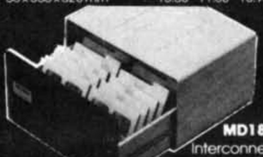
FOR PAYMENT WITH ORDER MIN VALUE £8.90 or £1.50 HANDLING CHARGE.
FOR ACCOUNT CUSTOMERS MIN VALUE £15.00 or £3.00 HANDLING CHARGE.

SPRING CATALOGUE OUT NOW
PLEASE RING OR WRITE FOR YOUR FREE COPY

Anti-static Lock lid
MD120
5¼ x 120

MD100
5¼ x 100

PS10


MD180
Interconnecting, Stackable
MD180 5¼ x 180 MD150 3½ x 150

Swivel Base
Adjusts by front dial turns 360°
Tilt up & down 25°

-MICRO MEDIA- TEL: LEICESTER 0533 856622 -MICRO MEDIA- TEL: LEICESTER 0533 856622 -MICRO MEDIA-

◄ From Page 21

```
  580 ENDPROC
  590 DEFPROCchrs
  600 VDU23,224,0,15,63,127,127,255,255,
255
  610 VDU23,225,0,240,252,254,254,255,25
5,255
  620 VDU23,226,255,255,255,127,127,63,1
5,0
  630 VDU23,227,255,255,255,254,254,252,
240,0
  640 ENDPROC
```

Get it right!

```
  10 =    0 0 | 120 = 181D 7 | 230 = 2165 E | 340 = 53D0 4 | 450 = 7552 3 | 560 = 8D43 C
  20 =    0 0 | 130 = 5105 5 | 240 = C03A D | 350 = FD2E B | 460 = 2C83 B | 570 = 2C83 5
  30 =    0 0 | 140 = C2B3 1 | 250 = BBFA C | 360 = B38B 5 | 470 = D8C2 7 | 580 = ED0F A
  40 = 8AFC C | 150 = 3E10 7 | 260 = 5B81 1 | 370 = EF1A 8 | 480 = 3C85 8 | 590 = 4129 C
  50 = 7B69 0 | 160 = FF20 0 | 270 = EA3A E | 380 = F9C0 0 | 490 = 458C 3 | 600 = 462C 2
  60 = 8E20 D | 170 = 387B 1 | 280 = 5F8B 0 | 390 = A4A1 6 | 500 = 8417 9 | 610 = B029 7
  70 = 3344 8 | 180 = DF16 F | 290 = C7BD 3 | 400 = 6E20 0 | 510 = A4A1 6 | 620 = 1FC3 E
  80 = 155D 5 | 190 = EEAF A | 300 = 5BF0 E | 410 =  B75 3 | 520 = DE0F C | 630 = B0BB A
  90 = E62C 0 | 200 = 2A9A 7 | 310 = 18EF E | 420 = 1C75 6 | 530 = 7F5C 0 | 640 = ED0F 0
 100 = 19E4 5 | 210 = A2CA 9 | 320 = ABDE E | 430 = F059 9 | 540 = 18AD 7 |
 110 = 404D 3 | 220 = BD65 0 | 330 = 27CE 9 | 440 = FF39 F | 550 = 2C83 C |
```

```
   10 REM MER2
   20 REM MERRILLS by Cliff Hamer
   30 REM (c) The Micro User
   40 REM*FX220,0
   50 DIMX%(16),Y%(16),Z%(16)
   60 DIMPS%(24),M%(16)
   70 DIMV%(24),W%(24),d%(24),e%(24)
   80 REPEAT
   90 PROCx(20,240,400,440,0)
  100 PROCinit
  110 REPEAT:cn%=cn%+1
  120 PROCon(re%)
  130 PROCml(re%)
  140 IFml%=1THENPROCof(re%)
  150 PROCon(bl%)
  160 PROCml(bl%)
  170 IFml%=1THENPROCof(bl%)
  180 UNTILcn%=9
  190 PROCplay
  200 PROCwin
  210 PROCag
  220 UNTILFALSE
  230 END
  240 DEFPROCplay
  250 REPEAT
  260 IFfin%=1THEN320
  270 IFRE%>3THENPROCgo(re%)ELSEPROCjump
(re%):OK%=0
  280 IFOK%=1THENPROCmove(re%):PROCml(re
%):IFml%=1THENPROCof(re%)
  290 IFfin%=1THEN320
  300 IFBL%>3THENPROCgo(bl%)ELSEPROCjump
(bl%):OK%=0
  310 IFOK%=1THENPROCmove(bl%):PROCml(bl
%):IF ml%=1THENPROCof(bl%)
  320 UNTILfin%=1
  330 ENDPROC
  340 DEFPROCinit
  350 VDU19,2,4,0,0,0
  360 X%(0)=0:Y%(0)=0:Z%(0)=0
  370 OK%=0:CNT%=0
  380 cn%=0:ml%=0:re%=1:bl%=2:fin%=0
  390 RESTORE2850:f%=0
  400 FORa%=1TO8:FORb%=1TO3:f%=f%+1
  410 READc%:d%(f%)=a%:e%(f%)=c%
  420 NEXT:NEXT
  430 RESTORE2730:FORf%=1TO16
  440 READa%,b%,c%
  450 X%(f%)=a%:Y%(f%)=b%:Z%(f%)=c%
  460 M%(f%)=0:NEXT
  470 PROCCIRC:COLOUR3
  480 RESTORE2770:FORf%=1TO24
  490 READa%,b%
  500 V%(f%)=a%:W%(f%)=b%:PS%(f%)=0
  510 COLOUR0
  520 PRINTTAB(V%(f%),W%(f%));C$:NEXT
  530 PROCblk
  540 P%=0:TI%=1:TU%=0:MU%=0
  550 BL%=9:RE%=9:H%=16
  560 FORG%=0TO16STEP2:COLOUR1
  570 PRINTTAB(1,G%);C$;
  580 COLOUR2:PRINTTAB(6,G%);C$;:NEXT
  590 W$="MERRILLS"
  600 FORG%=0TO9STEP9
  610 FORI%=1TO8:COLOUR(G%DIV5)+1
  620 PRINTTAB(4,G%+I%)MID$(W$,I%,1)
  630 NEXT:NEXT
  640 ENDPROC
  650 DEFPROCblk
  660 FORG%=1TO24:PROCmen(G%,0):NEXT
  670 ENDPROC
  680 DEFPROCmen(G%,c%):COLOURc%
  690 PRINTTAB(V%(G%),W%(G%));C$
  700 PLOT68,V%(G%)*32+16,(31-W%(G%))*32
+10
  710 VDU5:COLOUR3
  720 COLOUR3:PRINTCHR$(G%+64)
  730 VDU4
  740 ENDPROC
  750 DEFPROCml(TU%)
  760 RW%=0:ml%=0:mu%=0
```

This is one of hundreds of programs now available FREE for downloading on MicroLink

```
  770 FORI%=1TO16
  780 IFX%(I%)=P%ORY%(I%)=P%ORZ%(I%)=P%T
HENRW%=I%ELSE810
  790 IFPS%(X%(RW%))=TU%ANDPS%(Y%(RW%))=
TU%ANDPS%(Z%(RW%))=TU%THENmu%=1
  800 IFmu%=1ml%=1:M%(RW%)=TU%
  810 COLOUR3:mu%=0:NEXT
  820 ENDPROC
  830 DEFPROCof(TU%)
  840 tu%=TU%+1:IFtu%=3tu%=1
  850 CAN%=0:FORt%=1TO24
  860 IFPS%(t%)<>tu%GOTO880
  870 IFM%(d%(t%))<>tu%ANDM%(e%(t%))<>tu
%THENCAN%=1
  880 NEXT
  890 IFCAN%=0THENPROCod:ENDPROC
  900 SOUND&11,1,120,121
  910 REPEAT:REPEAT
  920 PROCx(190,84,1150,144,TU%)
  930 COLOUR128+TU%:COLOUR3
  940 CT%=0:RW%=0:M%(0)=0:L%=0
  950 PRINTTAB(25,28);" ":*FX15,1
  960 IFTU%=1THENPRINTTAB(7,28);"REMOVE
WHICH BLUE PIECE? ";ELSEPRINTTAB(7,28);"
 REMOVE WHICH RED PIECE? ";
  970 K%=FNget:PRINTCHR$(K%)
  980 TN%=TU%+1:IFTN%=3THENTN%=1
  990 R%=K%-64:UNTILPS%(R%)=TN%
 1000 REPEAT:L%=L%+1
 1010 IFX%(L%)=R%ORY%(L%)=R%ORZ%(L%)=R%T
HENRW%=L%
 1020 IFM%(RW%)=TN%THENCT%=1
 1030 UNTILCT%=1ORL%>15
 1040 IFCT%=1THENSOUND&11,1,140,121:PRIN
TTAB(7,28)"   NOT ALLOWED_try again.  "
 1050 PROCfl(R%,CNT%MOD2+1)
 1060 PROCmen(R%,CNT%MOD2+1)
 1070 UNTILCT%=0:COLOUR128
 1080 PROCx(190,86,1150,146,0)
 1090 PS%(R%)=0
 1100 PRINTTAB(V%(R%),W%(R%));B$
 1110 MU%=0:P%=0
 1120 IFTN%=1THENRE%=RE%-1ELSEBL%=BL%-1
 1130 PROCmen(R%,0)
 1140 IFBL%<3ORRE%<3THENfin%=1
 1150 ENDPROC
 1160 DEFPROCon(TU%)
 1170 CNT%=CNT%+1:REPEAT
 1180 PROCx(20,360,400,440,TU%)
 1190 COLOUR3:last=TU%
 1200 IFTU%=1 COLOUR129 ELSE COLOUR130
 1210 IFTU%=1PRINTTAB(3,19);"REDS GO";EL
SEPRINTTAB(2,19);"BLUES GO";
 1220 *FX15,1
 1230 COLOUR3:K%=FNget
 1240 PRINTTAB(11,19)CHR$(K%):COLOUR128
 1250 P%=K%-64:UNTILPS%(P%)=0
 1260 PS%(P%)=TU%:IFTU%=1L%=1ELSEL%=6
 1270 PRINTTAB(L%,H%)B$;:IFTU%=2H%=H%-2
 1280 PROCfl(P%,TU%)
 1290 PROCmen(P%,TU%)
 1300 ENDPROC
 1310 DEFPROCgo(TU%)
 1320 *FX15,1
 1330 OK%=0:FORL%=1TO16
 1340 IFPS%(X%(L%))=TU%ORPS%(Y%(L%))=TU%
ORPS%(Z%(L%))=TU%THENRW%=L%ELSE1390
 1350 IFPS%(X%(RW%))=TU%ANDPS%(Y%(RW%))=
0THENOK%=1
 1360 IFPS%(Y%(RW%))=TU%ANDPS%(X%(RW%))=
0THENOK%=1
 1370 IFPS%(Y%(RW%))=TU%ANDPS%(Z%(RW%))=
0THENOK%=1
 1380 IFPS%(Z%(RW%))=TU%ANDPS%(Y%(RW%))=
0THENOK%=1
 1390 NEXT
 1400 IFOK%=0fin%=1
 1410 ENDPROC
 1420 DEFPROCmove(TU%)
```

Listing II

```
 1430 COLOUR3:CNT%=CNT%+1:REPEAT:REPEAT
 1440 PROCx(20,240,400,440,TU%)
 1450 IFTU%=1 COLOUR129 ELSE COLOUR130
 1460 IFTU%=1PRINTTAB(3,19);"REDS GO"ELS
EPRINTTAB(2,19);"BLUES GO"
 1470 PRINTTAB(3,21);"MOVE-";:K%=FNget
 1480 PRINTTAB(9,21)CHR$(K%):COLOUR128
 1490 ol%=K%-64:UNTILPS%(ol%)=TU%
 1500 OK%=0:FORL%=1TO16
 1510 IFX%(L%)=ol%ORY%(L%)=ol%ORZ%(L%)=o
l%THENRW%=L%ELSE1560
 1520 IFX%(RW%)=ol%ANDPS%(Y%(RW%))=0THEN
OK%=1
 1530 IFY%(RW%)=ol%ANDPS%(X%(RW%))=0THEN
OK%=1
 1540 IFY%(RW%)=ol%ANDPS%(Z%(RW%))=0THEN
OK%=1
 1550 IFZ%(RW%)=ol%ANDPS%(Y%(RW%))=0THEN
OK%=1
 1560 NEXT
 1570 UNTILOK%=1
 1580 FORL%=1TO16
 1590 IFX%(L%)=ol%ORY%(L%)=ol%ORZ%(L%)=o
l%THENM%(L%)=0
 1600 NEXT
 1610 OK%=0:REPEAT:REPEAT
 1620 PROCx(20,240,400,290,TU%)
 1630 IFTU%=1COLOUR129 ELSE COLOUR130
 1640 PRINTTAB(3,23);"  TO- ";:K%=FNget
 1650 PRINTTAB(9,23)CHR$(K%)
 1660 ne%=K%-64:UNTILPS%(ne%)=0
 1670 COLOUR128
 1680 FORG%=1TO16
 1690 IFX%(G%)=ol%ORY%(G%)=ol%ORZ%(G%)=o
l%THENRW%=G%ELSE1740
 1700 IFY%(RW%)=ol%ANDX%(RW%)=ne%THENOK%
=1
 1710 IFY%(RW%)=ne%ANDX%(RW%)=ol%THENOK%
=1
 1720 IFY%(RW%)=ol%ANDZ%(RW%)=ne%THENOK%
=1
 1730 IFY%(RW%)=ne%ANDZ%(RW%)=ol%THENOK%
=1
 1740 NEXT:UNTILOK%=1
 1750 PS%(ol%)=0:PS%(ne%)=TU%:P%=ne%
 1760 PRINTTAB(V%(ol%),W%(ol%));B$;
 1770 PROCmen(ol%,0)
 1780 PROCfl(ne%,TU%)
 1790 PROCmen(ne%,TU%)
 1800 ENDPROC
 1810 DEFPROCjump(TU%)
 1820 CNT%=CNT%+1
 1830 *FX15,0
 1840 SOUND&11,1,200,121
 1850 IFTU%=1ANDRE%<3THEN ENDPROC
 1860 IFTU%=2ANDBL%<3THEN ENDPROC
 1870 COLOUR3:*FX15,1
 1880 REPEAT:PROCx(20,240,400,440,TU%)
 1890 IFTU%=1 COLOUR129 ELSE COLOUR130
 1900 IFTU%=1PRINTTAB(3,19);"REDS GO "EL
SEPRINTTAB(2,19);"BLUES GO"
 1910 PRINTTAB(3,21);"JUMP-";:K%=FNget
 1920 PRINTTAB(8,21)CHR$(K%)
 1930 ol%=K%-64:UNTILPS%(ol%)=TU%
 1940 REPEAT:PROCx(20,240,400,290,TU%)
 1950 IFTU%=1COLOUR129 ELSE COLOUR130
 1960 PRINTTAB(4,23);"TO-";:K%=FNget
 1970 PRINTTAB(8,23)CHR$(K%)
 1980 ne%=K%-64:UNTILPS%(ne%)=0
 1990 COLOUR128:FORG%=1TO16
 2000 IFM%(G%)=TU%THENM%(G%)=0
 2010 NEXT
 2020 PS%(ol%)=0:PS%(ne%)=TU%:P%=ne%
 2030 PRINTTAB(V%(ol%),W%(ol%));B$;
 2040 PROCmen(ol%,0)
 2050 PROCfl(ne%,TU%)
```

Turn to Page 110 ▶

```
  10 =    0 0
  20 =    0 0
  30 =    0 0
  40 =    0 0
  50 = BE27 7
  60 = 9713 8
  70 = ADEE 9
  80 = BFBA F
  90 = 9D52 F
 100 = DEBB A
 110 = AFE4 D
 120 = BD24 F
 130 = 5687 5
 140 = F5D4 0
 150 = 3812 1
 160 = D3B1 D
 170 = 70E2 0
 180 = 6AFC 8
 190 =    F C
 200 = 1367 9
 210 = A968 1
 220 = E014 C
 230 = FD2E 6
 240 = EAF8 4
 250 = BFBA 0
 260 = D866 B
 270 = 30E7 B
 280 = 9F9A 1
 290 = D866 D
 300 = 4215 D
 310 = CF56 5
 320 = 65CE 9
 330 = ED0F B
 340 = 344C D
 350 = 38C9 4
 360 = B30B B
 370 =    7 8
 380 = B989 8
 390 = 642B 4
 400 = F061 4
 410 = 73E1 3
 420 = 24BD 5
 430 = ADA0 1
 440 = D5B1 B
 450 = E7D4 E
 460 = 9D4A 0
 470 = 8A29 E
 480 = B228 C
 490 = 8DF2 2
 500 = F9C2 9
 510 = F968 5
 520 = 8283 1
 530 = 14A4 C
 540 = 53EE 6
 550 = 8ED8 5
 560 = C637 C
 570 = C602 9
 580 = B389 1
 590 = B7C6 2
 600 = 3B06 7
 610 = E76C 0
 620 =  3EE A
 630 = 24BD F
 640 = ED0F 6
 650 =  23C 5
 660 = FE92 B
 670 = ED0F 5
 680 = 2D5E 5
 690 = 62D4 A
 700 = 2D5F 3
 710 =  536 8
 720 = CA15 A
 730 = 765B 1
 740 = ED0F 7
 750 = 6E53 9
 760 = D628 A
 770 = 78C3 F
 780 = CB92 7
 790 = C3B5 8
 800 = 8AE4 A
 810 = ACAE 0
 820 = ED0F B
 830 = 88B2 3
 840 =  42D 8
 850 = FB81 9
 860 = 864B 3
 870 = 4F1E D
 880 = 2C83 5
 890 = F768 0
 900 = B534 B
 910 = 5D46 1
 920 = 10C8 F
 930 = 651C 7
 940 = 8057 6
 950 = 53AB 0
 960 = 71CF 7
 970 = 1BC8 8
 980 = 297C D
 990 = 1732 5
,000 = D0E9 6
1010 = 9C5B A
1020 = 21DB A
1030 = 20D5 3
1040 = E337 4
1050 = E876 8
1060 = 243B 5
1070 =  853 D
1080 = 9933 5
1090 = A75A 6
1100 = 5F0A 9
1110 = 39C0 6
1120 = A812 F
1130 = A634 1
1140 = 956C 6
1150 = ED0F 7
1160 = 85F0 4
1170 = 4B77 9
1180 = 83EF A
1190 = 75E6 7
1200 = 56B1 7
1210 = 6B82 0
1220 = 7CA7 E
1230 = F739 8
1240 = 8143 F
1250 = 927D C
1260 =  5F7 B
1270 = B21D E
1280 = DB09 A
1290 = D3FE 3
1300 = ED0F A
1310 = 53FD D
1320 = 7CA7 8
1330 = 2D5E 6
1340 =  87B 5
1350 = E423 7
1360 = C1DB C
1370 = 81B2 3
1380 = EFBA C
1390 = 2C83 F
1400 = 6E2B 4
1410 = ED0F 8
1420 = D1F9 3
1430 = 47C8 7
1440 = 6612 0
1450 = 56B1 0
1460 = 8B6D 8
1470 = 9F1E 7
1480 = E10C C
1490 =  5CE 6
1500 = 2D5E 0
1510 = 76DB 7
1520 = A720 4
1530 = 5642 6
1540 = 162B 5
1550 = 15AC 8
1560 = 2C83 8
1570 = E360 5
1580 =  164 6
1590 = 4740 0
1600 = 2C83 C
1610 = 8486 8
1620 =  CD3 3
1630 = EAEB 5
1640 = 36D2 6
1650 = 15D8 E
1660 = AB65 6
1670 = A76B E
1680 = 4A4B F
1690 = C8A5 C
1700 = BC01 0
1710 = 53D7 2
1720 = 9DC5 E
1730 = 7213 7
1740 = 6FFE 0
1750 = 90C8 1
1760 = EAA3 A
1770 = F022 B
1780 = 7FE4 7
1790 =  9EC 0
1800 = ED0F 6
1810 = E94B F
1820 = 33FA E
1830 = 6C86 4
1840 = E6F6 E
1850 = 4DD7 B
1860 = EA60 E
1870 = B270 C
1880 = FCE8 9
1890 = 56B1 5
1900 = ADC7 B
1910 = D76D 6
1920 = 1A7E D
1930 =  5CE B
1940 = 9629 A
1950 = EAEB B
1960 = DCE9 1
1970 = 7A9D A
1980 = AB65 3
1990 = A323 6
2000 = 9070 8
2010 = 2C83 2
2020 = 90C8 F
2030 = EAA3 B
2040 = F022 0
2050 = 7FE4 1
2060 =  9EC C
2070 = 7A32 D
2080 = 36CA 1
2090 = 30AE 7
2100 = ED0F A
2110 = EDC4 0
2120 = 68F0 3
2130 = 9933 F
2140 = B5AB 7
2150 = 6C86 0
2160 = 1489 A
2170 = 288E 6
2180 = ED0F 4
2190 =  5FF 3
2200 = A251 8
2210 = 9165 F
2220 = D57E B
2230 = FE96 5
2240 = A631 D
2250 = 6A94 F
2260 =  7BB 5
2270 = A76B F
2280 = ED0F 2
2290 = 38ED B
2300 = 90DF A
2310 = EA0B F
2320 = FD58 2
2330 = 7CA7 F
2340 = ED0F F
2350 = C1F1 D
2360 = 91CE 4
2370 = ED0F 3
2380 = 16F3 6
2390 = BFBA E
2400 = BC7D 9
2410 = 8DF7 E
2420 = 852C 7
2430 =  FC9 3
2440 = 24E3 D
2450 = 2B9E B
2460 = D48C C
2470 = 2409 E
2480 = 5BD5 3
2490 = ED0F 0
2500 = 2B81 4
2510 = 6C86 C
2520 = 6D32 F
2530 = 7473 8
2540 = F0DD F
2550 = 77F1 D
2560 = ECF2 1
2570 = ED0F 8
2580 = CBCC 3
2590 = A76B 6
2600 =  DDE 4
2610 = C903 F
2620 = E9C5 F
2630 = B0E9 E
2640 = E9C5 8
2650 = 2C83 2
2660 = ED0F 4
2670 = F724 3
2680 =   74 B
2690 = 166C E
2700 = 2FA8 2
2710 =  40D B
2720 = ED0F 0
2730 = 48A1 8
2740 = D89D C
2750 = 94A0 8
2760 = E506 E
2770 = D82D 9
2780 = 16E1 D
2790 = B896 A
2800 = 3671 8
2810 = D6F5 8
2820 = E062 4
2830 = 8D08 3
2840 = 43C4 8
2850 = 8E7D C
2860 = D35D E
```

Get it right!

◀ *From Page 109*

```
 2060 PROCmen(ne%,TU%)
 2070 t%=TU%
 2080 PROCml(t%)
 2090 IF ml%=1 THEN PROCof(t%)
 2100 ENDPROC
 2110 DEFPROCtie
 2120 COLOUR3:COLOUR128
 2130 PROCx(190,86,1150,146,0)
 2140 PRINTTAB(10,28);"HONOURABLE DRAW"
 2150 *FX15,0
 2160 SOUND&101,1,100,10
 2170 SOUND&102,1,116,10
 2180 ENDPROC
 2190 DEFPROCwin
 2200 COLOUR3:*FX15,0
 2210 IFCNT%MOD2=1D%=1ELSED%=2
 2220 PROCx(190,86,1150,146,D%)
 2230 FORG%=108TO200STEP4
 2240 SOUND1,-15,G%,1:NEXT
 2250 IFCNT%MOD2=1 THEN COLOUR129 ELSE C
OLOUR130
 2260 IFCNT%MOD2=1THENPRINTTAB(7,28);"CO
NGRATULATIONS RED HAS WON"ELSEPRINTTAB(7
,28);"CONGRATULATIONS BLUE HAS WON";
 2270 COLOUR128
 2280 ENDPROC
 2290 DEFPROCag
 2300 PRINTTAB(7,30);"Press SPACE for an
other game";
 2310 REPEAT UNTILGET=32
 2320 PROCx(190,30,1150,150,0)
 2330 *FX15,1
 2340 ENDPROC
 2350 DEFPROCDEL(de%)
 2360 TIME=0:REPEATUNTILTIME=de%
 2370 ENDPROC
 2380 DEF FNget
 2390 REPEAT
 2400 k%=GET
 2410 UNTIL (k%>64 AND k%<89 ) OR k%=9 O
R k%=13
 2420 IF k% = 9 THEN CNT%=CNT%+1:PROCwin
:PROCag:RUN
 2430 IF k% = 13 THEN CNT%=CNT%+1:PROCti
e:PROCag:RUN
 2440 =k%
 2450 DEFPROCx(a%,b%,w%,h%,g%)
 2460 GCOL0,g%+128
 2470 VDU24,a%;b%;w%;h%;:CLG
 2480 VDU26:GCOL0,3
 2490 ENDPROC
 2500 DEFPROCod
 2510 *FX15,0
 2520 PROCx(470,86,1220,146,TU%)
 2530 SOUND1,-15,100,8:SOUND1,-15,88,10
 2540 PRINTTAB(19,28);"   HARD LUCK   "
 2550 PROCDEL(400)
 2560 PROCx(450,86,1250,146,0)
 2570 ENDPROC
 2580 DEFPROCfl(FL%,cl%)
 2590 COLOUR128
 2600 FORt%=9TO3 STEP -1:COLOUR0
 2610 COLOUR0:PROCDEL(t%)
 2620 PRINTTAB(V%(FL%),W%(FL%));C$
 2630 COLOUR cl%:PROCDEL(t%)
 2640 PRINTTAB(V%(FL%),W%(FL%));C$
 2650 NEXT
 2660 ENDPROC
 2670 DEFPROCCIRC
 2680 C1$=CHR$224+CHR$225:C2$=CHR$226+CH
R$227
 2690 C$=C1$+CHR$8+CHR$8+CHR$10+C2$
 2700 B1$=CHR$32+CHR$32:B2$=CHR$32+CHR$3
2
 2710 B$=B1$+CHR$8+CHR$8+CHR$10+B2$
 2720 ENDPROC
 2730 DATA 1,2,3,4,5,6,7,8,9,10,11,12
 2740 DATA 13,14,15,16,17,18,19,20,21,22
,23,24
 2750 DATA 1,10,22,4,11,19,7,12,16,2,5,8
 2760 DATA 17,20,23,9,13,18,6,14,21,3,15
,24
 2770 DATA13,01,25,01,37,01
 2780 DATA17,05,25,05,33,05
 2790 DATA21,09,25,09,29,09
 2800 DATA13,13,17,13,21,13
 2810 DATA29,13,33,13,37,13
 2820 DATA21,17,25,17,29,17
 2830 DATA17,21,25,21,33,21
 2840 DATA13,25,25,25,37,25
 2850 DATA9,12,16,10,12,15,11,12,14,9,10
,11
 2860 DATA14,15,16,11,13,14,10,13,15,9,1
3,16
```

POOLSWINNER II

THE ULTIMATE POOLS PREDICTION PROGRAM

- **MASSIVE DATABASE** Poolswinner is a sophisticated Pools prediction aid. It comes complete with the largest database available – 22000 matches over 10 years.
- **PREDICTS** Not just SCOREDRAWS, but AWAYS, HOMES and NO SCORES.
- **SUCCESSFUL** SELEC guarantee that Poolswinner performs significantly better than chance.
- **ADAPTABLE** Probabilities are given on every fixture – choose as many selections as you need for your bet. The precise prediction formula can be set by the user – you can develop and test your own unique method.
- **SIMPLE DATA ENTRY** All team names are in the program. Simply type in the reference numbers from the screen. Or use FIXGEN to produce fixture list automatically (see below).
- **LEAGUE AND NON-LEAGUE** All English and Scottish League teams are supported, and also the non-league sides often used on pools coupons.
- **PRINTER SUPPORT** Full hard copy printout of data if you have a printer.

PRICE £18.00 (all inclusive)

Boxed, with detailed instruction booklet

NOW AVAILABLE

FIXGEN 88/9 AT LAST: No more struggling for hours to get the fixture list into the computer. FIXGEN has been programmed with all English and Scottish League fixtures for 1988/89. Simply type in the date, and the full fixture list is generated in seconds. Fully compatible with Poolswinner. Yearly updates available.

POOLSWINNER with FIXGEN £19.50 (for both)

COURSEWINNER V3

THE PUNTERS COMPUTER PROGRAM

NOT JUST A TIPSTER PROGRAM, Coursewinner V3 can be used by experts and occasional punters alike. You can develop and test your own unique winning system by adjusting the analysis formula, or use the program in simple mode. Coursewinner V3 uses statistical analysis of major factors including past form, speed ratings, course statistics, prize money, weight, going, trainer and jockey form etc, etc. It outputs most likely winners, good long odds bets, forecasts, tricasts etc. The database includes vital course statistics for all British courses. You can update the database – never goes out of date. *FULL PRINTER SUPPORT.*

PRICE £18.00 (all inclusive) includes Flat AND National Hunt versions.

AVAILABLE FOR
All supplied on tape ...
(Automatic Conversion to disc)
AMSTRAD CPCs
BBCs
COMMODORE 64/128
SPECTRUM

DISCS ...
(Add £3.00)
AMSTRAD PCW
IBM Format
COMMODORE AMIGA
ATARI ST

Send Cheques/POs for return of post service to ...

selec SOFTWARE

phone 24 hrs

62 ALTRINCHAM RD, GATLEY, CHEADLE, CHESHIRE SK8 4DP. ☎ 061-428 7425

(Send for full list of our software)

SUMMER SALE

All Prices Slashed

	N.R.P. £	SALE £
Genie* in-a-box + cartridge	~~81.35~~	69.95
Genie Junior	~~26.00~~	19.95
Genie Real Time Clock for 'B' & Compact	~~30.90~~	25.99
Publisher	~~46.00~~	34.95
Font Library Disks	~~19.95~~	9.95

* Limited stock of battery-backed Genies

All prices include VAT and U.K. postage
Prices apply until end of August 1989
Phone our sales office for information sheets/educational prices/bulk purchases/site licences

PMS
PERMANENT MEMORY SYSTEMS
38 MOUNT CAMERON DRIVE
EAST KILBRIDE G74 2ES
03552 32796

£10 Prize letter

Search for more sounds like...

I READ with interest the article in your May issue, It sounds like ... *which explains the* Soundex *method of producing like sounding strings as possible matches. I am aware of at least one mainframe system with a national network which uses this when searching data.*

Some time ago I was involved with training of terminal operators immediately before the implementation of computerised systems at my place of work.

As a result I was made aware of a similar method of producing like sounding names as possible matches to a search on the the name field of a database record. We refer to it as an Extended search *and it works as follows:*

☐ *The first character of the search string is retained irrespective of what it is.*

☐ *If the last character of the string is S and is not double letters it is stripped off.*

☐ *W H Y and A E I O U are ignored.*

☐ *One letter from any double is ignored.*

The first four characters of the result – or what remains if less than four – are then used as the search string. If the data being searched through is crunched in the same way, any matches with the abbreviated search string will be considered a possible match to the original

Here's a short program to crunch a string – in capitals only:

```
 10 INPUT"Original",orig$
 20 srch$=LEFT$(orig$,1)
 30 IF RIGHT$(orig$,2)="S
S" : ELSE IF RIGHT$(orig$
,1)="S" orig$=LEFT$(orig$
,LENorig$-1)
 40 FOR L%=2 TO LENorig$
 50 c$=MID$(orig$,L%,1)
 60 IF INSTR("WHYAEIOU",c
$) THEN 100
 70 IF c$=MID$(orig$,L%+1
,1) THEN 100
 80 srch$=srch$+c$
 90 IF LENsrch$=4 L%=LENo
rig$
100 NEXT
110 PRINT"Result="srch$
120 GOTO10
```

If this is used as listed it will illustrate the like sounding effect of original strings when the crunched search strings match. It can easily be included in a procedure to add an extended search feature to a database type of application.

You should note that some thought should be given as to whether an extended search will be of benefit. Take the name BOWE/S for example: An extended search on this will match everything starting with B. – **G. W. Hetherington, Sunniside, Newcastle upon Tyne.**

Protection amendment

CLIVE Jones' neat listing protection method on Page 131 of the May issue of The Micro User *won't work if the last line of the program is a working line like ENDPROC. The problem is avoided by putting a dummy such as:*

```
9999 END
```

in the listing to be protected. – **Ted Kirk, St Helens, Merseyside.**

Even more protection

IN response to the letter Hiding catalogues in your April issue here is a program to protect the disc directory in a similar way to the Impact Demo disc supplied with your December 1988 edition.

The answer you provided to M. Curtis's letter involved a sector editor, which not everybody has, so this is easier to use:

```
 10 MODE7
 20 VDU23,1,0;0;0;0;
 30 PRINT"Disc Protect"
 40 PRINT"by Jason Kaye"
 50 PRINT'"1) CLS"
 60 PRINT'"2) PROTECT"
 70 PRINT'"3) BOTH"
 80 PRINT'"Which?";
 90 REPEAT G%=GET-&30
100 UNTIL G%>0 AND G%<4
110 PRINT;G%'
120 INPUT"Number of tracks
",T%
130 PRINT'"Drive number?";
140 REPEAT D%=GET-&30
150 UNTIL D%>-1 AND D%<4
160 PRINT;D%:T%=T%*10
170 DIM B%512,X%32
180 FOR L%=0TO511 STEP4
190 B%!L%=0:NEXT
200 IF G%AND2 B%!0=&170320
210 IF G%AND1 B%?0=12
220 Y%=X%DIV256:A%=127
230 B%?&106=T%DIV256
240 B%?&107=T%MOD256
250 X%?0=D%:X%!1=B%
260 X%?5=3:X%?6=75
270 X%?7=0:X%?8=0:X%?9=34
280 REPEAT:*FX21
290 SOUND 1,-1,240,5
300 SOUND 1,0,0,15:CLS
310 PRINT"Change discs!"
320 UNTILINKEY0>0:*FX15
330 CALL&FFF1
```

Please note that the routine clears any info from the directory, so you must format a disc and run the protection program on it, then copy the required programs on to it.

If you run it with a disc containing data you'll lose it all. – **Jason Kane, Dereham, Norfolk.**

Win a tenner

● **Want to write to The Micro User? The address is: Letters, The Micro User, Europa House, Adlington Park, Adlington, Macclesfield SK10 4NP.**

Writers of the most interesting letters receive a £10 prize.

Unnecessary interruption

I NOTICED with interest the Slow Box described on Page 27 of the May issue of The Micro User *– especially the listing for displaying the content of a particular location to help debugging.*

These were used with a special timer module to generate interrupts, but I found it possible to operate them under software alone, using the frame flyback event – every fiftieth of a second the count will be updated.

The necessary changes to do this are:

☐ *Remove label .rtn and change JMP &FFFF to RTS.*

☐ *Change the line beginning rtn!1 to simply read ?&220=0:?&221=9.*

☐ *Put an *FX14,4 as the last instruction.*

Although the routines only print legibly in Mode 7, the amount of room needed by a program in another mode can be easily assessed by temporarily running it in Mode 7 and noting the value of LOMEM displayed, taking due account of the value of HIMEM in the correct mode.

If a value of LOMEM and HIMEM in the program's correct mode of less than about &200 ever occurs the program is likely to give No room *when run in its proper mode.* – **Glyn D. Williams, Bala, Gwynedd.**

String not found

I AM having difficulty with the search option in the Card Index program from your May issue. For some reason strings are never found. Can you help? – **Ellen Perry, Falmouth, Devon.**

● We often change submitted programs slightly, arranging them so the listing is shorter to enable us to print more articles.

Unfortunately in this case the routine printed was not our final, tested, version – but there is only one character difference. If you change the < symbol in line 660 to > you'll find it works perfectly.

◀ From Page 111

Logger update

SINCE writing LOGGER – published in the February issue of The Micro User *– I use it all the time for keeping a log of my time at work.*

Every four or five weeks I start a new log file and when I did this recently I found a small bug. It is necessary to clear the log file after starting a new one or the program uses the length of the old log file.

Alternatively, clear the old file before pressing Escape to start the new one. Changing line 240 so that it reads as follows corrects this:

```
240 IF nn=FALSE new=OP
ENOUT(Dr$+Nn$):ld$="NEW
":EX%=EXT#new:CLOSE#new
```

Another improvement is to name the Basic suspended application. By inserting line 65 this name can be automatically generated from within the program:

```
65 *NAME LOGGER
```

– **Ian Summer, Hellesdon, Norwich.**

Managing your roms

I HAVE an issue 3 BBC A – upgraded to a B – and one of my roms interferes with two of my games. Is there any way to unplug this with a software command? Would Watford Electronics' Rom Manager help?

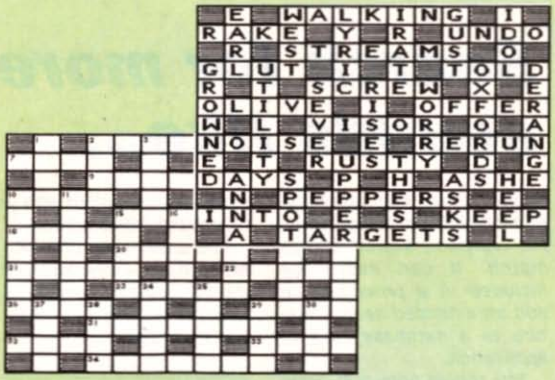
Also I am interested in getting 128k for my micro and wondered if it's possible to use the sockets on my Watford Sideways Rom board to get the extra memory? – **Alec Hanson, Reading, Berks.**

● If you frequently need to switch off roms the Rom Manager would certainly help. However you can do it from Basic very simply with this command:

```
?(&2A1+X)=0
```

where *X* is replaced by the rom position number of the one you want to remove. You can find the correct value for this by experiment or by looking on your rom board.

Then run your game using either *EXEC !BOOT or, if that fails, *RUN !BOOT. Only 16k ram can be added to the board you have.



FontStyle crosswords

THE FontStyle package really delights me as I am 60 years old and leave Barbarian and the like for my grandchildren to play while I write card games for her indoors and me to play.

But now, with Fontstyle, I can indulge in compiling crosswords – as you can see. – **D.A. Dallison, New Malden, Surrey**

Expert view on circus

I WORK in a circus and my main interest is the flying trapeze, so I was very interested to see Tynesoft's Circus Games. After loading the title screen, music and so on, then filling in the form, I went straight to Part 2, the trapeze section.

After a little practice I got the hang of getting my little flyer across to the second trapeze and back. Then I found that I could cheat by simply getting across and back three times, without performing the twists on the second run or the somersaults on the third.

The graphics on the game were not as good as I had expected and there was a lack of a background tune, which I put down to perhaps simple lack of memory space.

After a while I ran through all the sections and although I found it completely different from other games, I was a little disappointed.

No matter how I tried I couldn't control the tiger, with the result that I was eaten very rapidly. The trapeze section was the most fun for me but it was not true to life.

The flyer sometimes blended into the background and gravity was ignored – if real flyers could stay in the air as long as this chap there would be some fantastic flying acts around.

I feel this part of the game could have benefited from a plain background and perhaps the addition of a catcher to swing to as opposed to just a second trapeze bar. Again I expect lack of memory was to blame here.

The wire walker was good fun and quite easy to control. Again, detail was not so good, but the addition of the aerial view of the wire walker was a plus point.

The horse riding surprised me, as I'd thought the trapeze section would have been my out and out favourite. However on all four parts I was annoyed by the fact that I had to rewind the tape each time the picture of each event appeared on the screen in order to continue loading.

The actual loading time was quite long too, about 7.5 minutes – I suppose that's my own fault for not having a disc drive.

Another thing that could have been included during the form filling in stage was to ask whether the player is male or female as when walking the wire the program refers to his and during the riding event it is hers. All very well if your name is Tom for the wire walking, but a bit daft otherwise.

To give marks out of 10 I would rate Graphics as 6, sound as 5, playability as 6 and value for money 4 – all in all a little disappointing. But then, I am comparing a micro game with the real thing. – **Larry de Wit, Gerry Cottle's Circus, Addlestonemoor, Weybridge.**

Rodent for Repton

OWNERS of Quest Mouse, Quest Paint and any version of Repton 3 will know that the game Editor won't work with the mouse. To remedv this type:

```
*DIR E
LOAD"EDITOR"
80 *MOUSEON
RUN
```

Now the mouse will work in the editor. – **David Stott, Caldecote, Cambridge.**

Chip chat

IN your February issue Mike Cook recommended replacing IC14 with a 74ALS254. As there is no such chip, I was wondering if he meant a 74ALS245. – **A. Grainger, Pott Shrigley, Cheshire.**

● The 74ALS245 is the high power version of the 74LS245 and is in fact what is required.

£10 Prize letter

Putting on the style in program flow control

IT seems to have been a long time since I read any articles on programming style. I'd like to throw the cat among the pigeons and show how some of the program flow control features that BBC Basic lacks can be implemented.

This may be controversial, as it uses the dreaded GOTO and a little used – normally to be avoided – aspect of the way BBC Basic interprets loops: A FOR can have several NEXTs and REPEAT may be matched by several UNTILs.

Nevertheless, it is my sincere hope that the manner of their use will be met with approval, especially as they provide some constructs not normally available to the BBC Basic programmer and should still encourage good programming style.

The one main loop construct missing from Basic is WHILE. In a REPEAT ...UNTIL loop such as Listing I, the code is always executed once before the condition – cond – is tested. If cond is FALSE, or zero, the code is executed again until cond is TRUE – non-zero.

```
1 REPEAT
2 code
3 UNTIL cond
```

Listing I

Very often it is required to carry out a test at the beginning of a loop so that the code may be skipped altogether and this is where WHILE comes in.

Listing II shows a typical implementation of WHILE where cond is tested before code is executed. In this case, if cond is FALSE the code is skipped and program execution resumes after ENDWHILE. The instruction block is only executed while cond is TRUE.

```
1 WHILE cond
2 code
3 ENDWHILE
```

Listing II

Basic V does include WHILE, but for those us without the necessary funds to upgrade, reproducing the effect of WHILE can be a real pain.

Listing III shows one possible approach to the problem but there are three points here:

☐ cond appears in two separated places making errors more likely, especially if it's complicated.

```
1 IF NOT cond THEN GOTO 5
2 REPEAT
3 code
4 UNTIL NOT cond
5 REM end while
```

Listing III

☐ UNTIL and WHILE react oppositely to cond – it is necessary to negate it with NOT in order to have the desired effect. This makes it hard to read and understand.

☐ Because NOT does a bitwise negation rather than a logical one, it can have some unexpected effects. If cond has a value of one, for example, it is interpreted as TRUE, but so is NOT 1.

How can we avoid these problems? Listing IV – ignoring lines 3 and 4 for the moment – shows lines 1 and 6 which form an infinite REPEAT loop except that line 1 contains a test performed before any of the code in the rest of the loop.

```
1 REPEAT:IF cond ELSE GOTO 7
2 code
3 IF loop-cond THEN UNTIL FALSE
4 IF break-cond THEN GOTO 7
5 code
6 UNTIL FALSE
7 UNTIL TRUE:REM end while
```

Listing IV

If it is TRUE the loop is executed but when it's FALSE – which may occur the first time the test is carried out – the program branches to line 7, where an UNTIL TRUE terminates the loop.

This carries out all the functions of a WHILE loop using a single test without negating cond, and it even reads a bit like WHILE in the sense that REPEAT: IF means the same thing.

During my perusal of other languages, I have come across a couple of extra commands that allow finer control over the execution of loops and would, therefore, be useful in Basic.

Even though the programs I write are usually quite simple, it's surprising how often I find myself in the middle of a loop looking for a way out. Two such commands are LOOP or CONTINUE and BREAK.

These commands are only used inside loops and usually in association with an IF test. In these examples a test is always used. If these commands are executed without such a test the code should probably be rewritten.

LOOP provides a way of skipping any remaining code in a loop. Execution resumes at the point in the loop where the test is made to determine whether to continue or terminate the loop.

For WHILE this is at the top of the loop, for REPEAT and FOR it's at the bottom – UNTIL and NEXT. The implementation of LOOP is shown for each case in line 3 of Listings IV, V and VI.

Moving on to BREAK, this has the effect of aborting the loop altogether. Execution resumes with the code following the loop. The implementation of BREAK is shown for each case in line 4 of Listing IV, V and VI.

```
1 REPEAT
2 code
3 IF loop-cond THEN GOTO 6
4 IF break-cond THEN UNTIL
TRUE:GOTO 7
5 code
6 UNTIL cond
7 REM end repeat
```

Listing V

Again, FOR needs special consideration here. By setting the loop control variable – var – to exp2, we can guarantee the termination of the loop regardless of the sign of exp3 as long as it's not zero.

But changing exp2 in the loop will affect the value of var in line 4 of Listing VI, which might not then terminate the loop as expected. Consequently, you should ensure that exp has the same value in line 4 as it had in line 1 upon entry to the loop.

```
1 FOR var = exp1 TO exp2 S
TEP exp3
2 code
3 IF loop-cond THEN GOTO 6
4 IF break-cond THEN var=e
xp2:GOTO 6
5 code
6 NEXT
7 REM end for...next
```

Listing VI

You should also be aware that the conditions for the loop are only determined the once, on entry to the loop. This can trip up the unwary programmer.

Changing the value of exp2 or exp3 in the loop will not affect the sequence of values that var takes on – in this implementation of Basic – but is a poor practice that should be avoided. – **Grimble Gromble, Melksham, Wilts.**

ALL programs printed in this magazine are exact reproduction of listings taken from running programs which have been thoroughly tested.

However, on the rare occasions when mistakes occur corrections are published as a matter of urgency. Should you encounter error messages when you type in a program, they will almost certainly be the result of your own typing mistakes.

Unfortunately we can no longer answer personal programming queries concerning these mistakes. Of course letters about suggested errors will be investigated without delay, but any replies found necessary will only appear in the letters pages.

NOW OUT!

The bright new magazine that shows you how easy it is to make your own video movies...

VIDEO ACTION!
The COMPLETE guide for video camera users
Canon's best goes on test
Hints and tips on videoing children
WIN

If you have a video camera – or just thinking of getting one – you'll find *Video Action!* your passport to an exciting new world. No dull technical reviews but pages packed with help and advice – written by experts in a language ***anyone*** can understand. You'll find all you need to know about lighting, scripting, directing, sound dubbing . . . and the magic of desktop video – using a home computer to create titles and captions and generate your own startling special effects.

It's available at your newsagents now for £1.50. If you take out a 12 month subscription on the form below you'll save £5 off the normal price.
(UK only)

ORDER FORM

Please send me the next 12 issues of Video Action! for the special price of £13 (normally £18) (1530)

Payment: Please indicate method (✓)

☐ *Access/Mastercard/Eurocard/Barclaycard/Visa* *Expiry Date* ☐/☐

No. ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

☐ *Cheque/Eurocheque made payable to Database Publications Ltd.*

Name ____________________

Signed ____________________

Address ____________________

____________________ *Post Code* __________

Send to: Database Direct, Freepost, Ellesmere Port,
South Wirral L65 3EB. Tel: 051-357 2961

MU8

LABELMASTER PLUS
AVAILABLE AT LAST FOR MASTER AND ARCHIMEDES!

All your label-printing requirements in one extremely user-friendly program. Many super new features - the most versatile and powerful labeller available.
All the features you could possibly want from a labeller - please telephone for details.

Single colour version	**Multi-colour version (For colour printer)**
£24	**£29**

LABELMASTER still available for BBC B - described by the Times Educational Supplement as the best labelling software for BBC micros.

Single colour version	**Multi-colour version**
£18	**£23**

Please state model and disc format when ordering.

LABELS

45x11mm	1000 - £5.75	2000 - £10.50
70x24mm	1000 - £4.50	2000 - £8.00
70x36mm	1000 - £5.50	2000 - £10.00
89x36mm	1000 - £5.75	2000 - £10.50

All prices include VAT and p & p

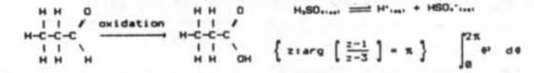
LABELWISE, **17 Ingfield Terrace, Slaithwaite, Huddersfield HD7 5BJ**
(formerly Calderdata) **0484 846126**

Sciways for Scientists

- Over 350 defined characters accessible with simple 2-key codes
- All characters printable on both screen and printer
- User defined characters can be stored on disc
- All facilities can be used with word processors or with BASIC
- Tested with BASIC I & II, Wordwise, Wordwise Plus, View 2.1, View 3.0, on the Master 128, B+ & Model B, and with Epson/compatible printers

GREEK ALPHABET: Upper and Lower case, upright and Italic
Α Β Γ Δ Ε Ζ Η Θ Ι Κ Λ Μ Ν Ξ Ο Π Ρ Σ Τ Υ Φ Χ Ψ Ω

SCIENTIFIC CHARACTERS: Mainly mathematical but also chemical symbols



Orders accepted from schools, colleges, establishments, etc.
Private orders – cheque with order, please

PRICE £39.95 inc VAT, p&p
16k ROM, 40/80 disc & manual
(not compatible with Inter-Word)

Mayhew Telonics,
376a Ringwood Road,
Poole, Dorset BH12 3LT
Tel: (0202) 747695

ROOM 7 SOFTWARE

INVESTMENT ANALYSER 2
NOW REDUCED TO
£19.55

POCKET ENGINEER
£34.50
THIS PROGRAM TO BE RELEASED IN MS-DOS

Fully bound software catalogue
50p P & P.
Refundable with order or Free with each Purchase

SUPER! BOOT PROGRAM
£6.90

SOCCER BOSS
£3.99

ELECTRICAL CABLE SELECTOR
£17.25

Most of our programs are available for the Electron/B/B+/MASTER and COMPACT, 3.5" & 5.25" disc, and in DFS or ADFS.

Also covered by our catalogue - Soccer Boss, Pools cheque, Investment Analyser 2, Matrix, Central Heating calculator, Electrical cable selector, Structural Beam Calculator, Introduction to Statistics Easy Banker

Letters/cheques to: W.L. Computer Services, Dept. 4,
First floor, H.S.L. Building, 437 Warrington Road,
Rainhill, Mersevside L35 4LL. Tel 051-426 9660

VISA

BeebDOS version 2.02 (New) from MicroBoss

Software for BBC and IBM file interchange

Runs on IBM-PC-XT-AT or compatibles and supports DOS 2.0 or later
Supplied on 360K IBM diskette with manual and plastic wallet the software includes:

BCOPY	Copy files BBC – IBM, IBM – BBC, BBC – BBC (wild cards allowed)
BCONV	Flexible IBM file translate facility enabling text to be passed between VIEW, WORDSTAR and Displaywrite 3 amongst other uses.
BGRAPH	Display BBC mode 0,1,2,4,5 screen format (AMX Art included) files on IBM standard colour (CGA), enhanced colour (EGA) or Hercules screens for use in IBM PC presentation, DTP, drawing and other graphic applications.

BeebDOS is almost a complete BBC DFS/ADFS for the IBM PC with utilities to catalogue, format, backup, delete, lock, unlock, compact rename, alter title & options, map free space, change and create directories of BBC diskette/files.

In fact BeebDOS is probably the fastest and most powerful BBC/IBM PC file transfer method available and no cables or serial connections are required.

£46
Inclusive of VAT

BBC double density diskette formats supported are Acorn ADFS, Watford, Solidisk, OPUS DDOS and UDM. Acorn single density DFS is only supported when running BeebDOS on an IBM AT or XT286 with a 360k disk drive. Please send or phone for an information sheet

CHEQUE OR POSTAL ORDER TRADE/EDUCATION ENQUIRIES WELCOME
MICROBOSS LTD 3 HADLEIGH RD FRINTON ESSEX CO13 9HG TEL (0255) 671095

Save up to £11

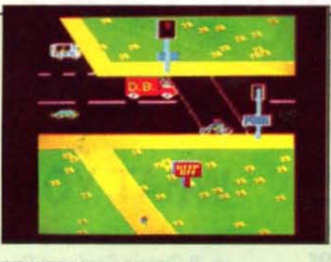
New Educational Bundle

FUN SCHOOL!

For a limited period we are offering ALL THREE Fun School 1 AND Nursery Rhymes in a special educational bundle.

Ages 2-5

- Alphabet
- Colours
- Counting
- House
- Magic Garden
- Matchmaker
- Numbers
- Pelican
- Seaside
- Snap

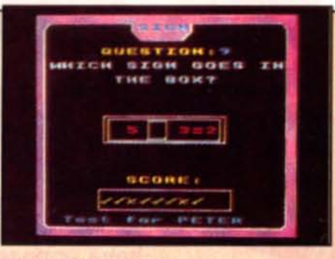


PELICAN

Teach your children to cross the road safely at a Pelican crossing

Ages 5-8

- Balance
- Castle
- Derrick
- Fred's Words
- Hilo
- Maths Test
- Mouser
- Number Signs
- Seawall
- Super Spell



NUMBER SIGNS

Provide the correct arithmetic sign and aim to score ten out of ten

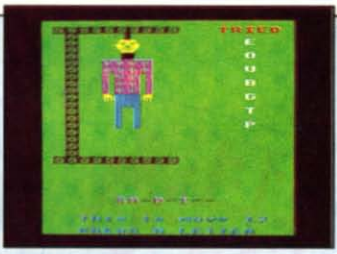
- Use your BBC Micro to teach and amuse your children at the same time.
- Three packages crammed full of educational programs – and so easy to use!
- Each program has been educationally approved after extensive testing in the classroom.

TAPE £9.95

5¼" DISC £12.95

Ages 8-12

- Anagram
- Codebreaker
- Dog Duck Corn
- Guessing
- Hangman
- Maths Hike
- Nim
- Odd Man Out
- Pelmanism
- Towers of Hanoi



HANGMAN

Improve your child's spelling with this fun version of the popular game

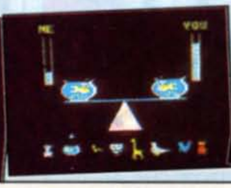
NURSERY RHYMES

5 fun-packed educational programs . . . for young children everywhere

This delightful collection of programs is based around children's favourite Nursery Rhymes. There's plenty of sparkling colour, sound and captivating animation to keep them riveted – and as they play they'll be learning all the way.

- ★ Tell the time with Hickory Dickory Dock.
- ★ Assemble the jigsaw in Humpty Dumpty.
- ★ Learn to spell with Jack and Jill.
- ★ Match the animals in See Saw Marjory Daw.
- ★ Play an exciting game in Hey Diddle Diddle.

Type the word now!
Went



Send for your collection today using the form on Page 119

THE MICRO USER

SUMMER COLLECTION

62 programs in all

RRP £38.65

OFFER PRICE £19.95

We've brought together some of the most popular compilations ever to have appeared in *The Micro User* for this summer special offer. For a limited period, we are offering them on seven 5.25" discs for the give-away price of just £19.95.

WHAT YOU GET

- ★ 9 Classic Card and Board Games Volume 1
- ★ 9 Classic Card and Board Games volume 2
- ★ Ten of the Best Ram and Disc Utilities
- ★ Ten of the Best Graphics Utilities
- ★ Ten of the Best Games
- ★ Ten of the Best Utilities
- ★ Classic Arcade Games

TEN of the BEST!

Ram and Disc Utilities

Ram Arrays
Printer Buffer
Prommer
Disabler
MOT
Disc Copy
Disc Catalog
Disc Protect
Dual Catalog
Safe Save

TEN of the BEST!

Graphics Utilities

MicroWorks
Pixel Editor
Flood Fill
Mode 7 Dump
Slim Characters
Special Fonts
Printer Control
Dual Screens
Characters
Charprint

TEN of the BEST!

Games

Dino
Hunkie Egg
Diamond Quest
Stellar Rescue
Fruit Machine
Karate Warrior
Maltese Cross
Othello
Witch Hunt
Soccer Manager

TEN of the BEST!

Utilities

Text Compressor
Variable Compressor
Line Compressor
BOS Editor
Basdat
Basic Repairer
Line Editor
Circles
Events
Stripper

9 Classic card & board games No. 2

Backgammon
Crib
Squares
Solitaire
Tic Tac Toe
Sliding Blocks
Poker
Sevens
Higher & Lower

For the BBC Micro and Electron

9 Classic card & board games No. 1

Draughts
Fives
Dominoes
Molecule
Reversi
Code Breaker
Patience
Pontoon
Pairs

For the BBC Micro and Electron

THE MICRO USER SPECIAL

Compendium of CLASSIC ARCADE GAMES

To order please use the form on Page 119

SUPERIOR SELECTION

Here's a special reader offer of the best games released by Superior Software – at savings of up to £5!

A QUESTION OF SPORT
pipeline
BY FAIR MEANS OR FOUL
SUPERIOR SOFTWARE Limited
Compatible with the BBC B
THE LAST NINJA

A Question of Sport

The home computer version of the most popular TV Sports quiz.

With David Coleman asking the questions and Ian Botham and Bill Beaumont heading the teams, you can pit your wits against your family, your friends or your computer.

There are six exciting rounds, including Pictureboard, Mystery Personality and a Quickfire Round.

Can you beat the experts?

	Tape	5.25" disc	3.5" disc
RRP	£12.95	£14.95	£19.95
Our Price	£9.95	£10.95	£14.95
SAVE	**£3**	**£4**	**£5**

Pipeline

In the 25th century the Earth's supplies of sulphur had become so badly depleted that mining operations were established on Io, one of the moons of Jupiter. Following a volcanic eruption on Io, the robot-controlled extraction platforms have been engulfed in a burning sea of sulphur and are now malfunctioning.

Can you save the day?

	Tape	5.25" disc	3.5" disc
RRP	£9.95	£11.95	£14.95
Our Price	£7.95	£8.95	£10.95
SAVE	**£2**	**£3**	**£4**

By Fair Means Or Foul

A realistic boxing simulation in which you can cheat... if the ref's not looking!

You're behind on points and time is running out. The ref looks half asleep. A quick head-butt and a sly punch below the belt and your opponent is toppling over. But as he falls his knee strikes you a paralysing blow.

Have you got what it takes?

	Tape	5.25" disc	3.5" disc
RRP	£9.95	£11.95	£14.95
Our Price	£7.95	£8.95	£10.95
SAVE	**£2**	**£3**	**£4**

The Last Ninja

The secrets of the Ninjitsu way had been jealously guarded for centuries, only once every decade were the scrolls seen at the ritual of the White Ninja. None coveted these secrets more than the evil Shogun. Seizing the opportunity of the ritual he sprang a fiendish trap that destroyed the brotherhood, except for one... You. The Last Ninja.

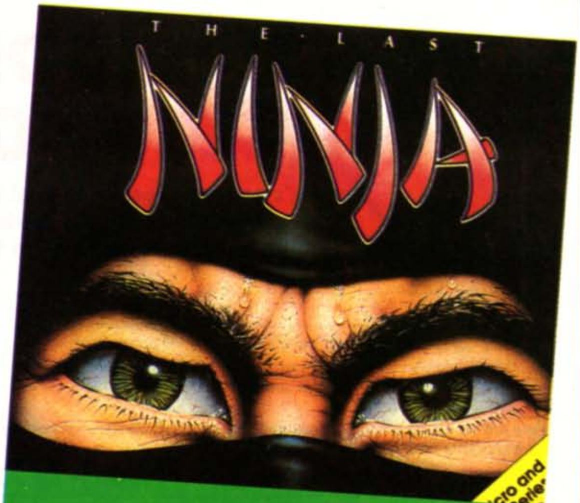
Your sworn oath is to recover the scrolls, you travel to the mystical lands of the Shogun. Already his guards are mastering the ways of the Ninjitsu. To reach the Shogun's Palace you must use all your weapon craft and fighting skills as you travel through dangerous wastelands and magnificent gardens, then descend into the direst dungeons before the final confrontation.

You cannot fail. You are the last Ninja...

	Tape	5.25" disc	3.5" disc
RRP	£9.95	£11.95	£14.95
Our Price	£7.95	£8.95	£10.95
SAVE	**£2**	**£3**	**£4**

To order please use the form on Page 119

Get THE·LAST NINJA FREE!


THE·LAST
NINJA

A subscription to *Micro User* is excellent value for money. With it you get the latest issue delivered to your door before it's in the shops PLUS a program packed cassette or disc with each magazine.

And now you get even more for your money because with your first issue we'll send you a copy of the latest hit from Superior Software, The last Ninja – absolutely FREE!

That's a gift worth £9.95 with the tape version, £11.95 for the 5.25" disc and £14.95 for the 3.5" disc version!

Place your order today. We'll send you The Last Ninja. And you'll receive* The Micro User *each month, plus the free tape or disc that will save the wear and tear on your fingers.

The story so far...

"The secrets of the Ninjitsu way had been jealously guarded for centuries, only once every decade were the scrolls seen at the ritual of the White Ninja.

"None coveted these secrets more than the evil Shogun. Seizing the opportunity of the ritual he sprang a fiendish trap that destroyed the brotherhood, except for one... You. The Last Ninja.

"Your sworn oath is to recover the scrolls, you travel to the mystical lands of the Shogun. Already his guards are mastering the ways of the Ninjitsu.

"To reach the Shogun's Palace you must use all your weapon craft and fighting skills as you travel through dangerous wastelands and magnificent gardens, then descend into the direst dungeons befor the final confrontation.

"You cannot fail. You are the last Ninja..."

Save up to £14.95

THE MICRO USER
December 1988
Fruits 40T
Code 2653
(c)Database Publications
THE MICRO USER
NOVEMBER 1988
THE MICRO USER
DECEMBER 1988
PLAY BOTH SIDES
THE MICRO USER
OCTOBER 1988
PLAY BOTH SIDES
Europa House, Adlington Park, Adlington Macclesfield SK10 4NP

To order please use the form on Page 119

THE MICRO USER

ORDER FORM

MAIL ORDER OFFERS

Please allow up to 28 days for delivery

Valid until August 31, 1989

Annual subscription

NEW

£ p

(with monthly tape or disc and The Last Ninja)

(See opposite)

		New *		Renewal	
Magazine + monthly tape	£23	*2371*	☐	*2372*	☐
Magazine + monthly (40 track) 5.25"disc	£23	*2373*	☐	*2374*	☐
Magazine + monthly (80 track) 5.25" disc	£23	*2375*	☐	*2376*	☐
Magazine + monthly 3.5" disc	£27	*2377*	☐	*2378*	☐
Europe & Eire: Surface £28		*2365*	☐	*2114*	☐
Overseas: Surface £34		*2366*	☐	*2367*	☐
Overseas: Air £45		*2004*	☐	*2113*	☐

** New subscriptions commence with next issue*

Back issues

February 1989	£1.75	*2523*	☐
March 1989	£1.75	*2524*	☐
April 1989	£1.75	*2525*	☐
May 1989	£1.75	*2526*	☐
June 1989	£1.75	*2527*	☐
July 1989	£1.75	*2528*	☐

Add 50p per issue for Europe & Eire/£2 Overseas

February–July 1989 bundle	£8.95	*2284*	☐

Add £3 for Europe & Eire/£12 Overseas

Impact Software

Clogger tape	£4.95	*2259*	☐
Clogger 5.25" disc (BBC B)	£4.95	*2195*	☐
Clogger 3.5" disc (Compact)	£6.95	*2196*	☐
Zenon tape	£4.95	*2260*	☐
Zenon 5.25" disc (BBC B)	£4.95	*2261*	☐
Zenon 3.5" disc (Compact)	£6.95	*2262*	☐
Orbital tape	£4.95	*2263*	☐
Orbital tape 5.25" disc (BBC B)	£4.95	*2264*	☐
Orbital tape 3.5" disc (Compact)	£6.95	*2265*	☐
Cheat it again, Joe Vol 1 cassette	£2.99	*2197*	☐
Cheat it again, Joe Vol 1 5.25" disc	£4.99	*2198*	☐
Cheat it again, Joe Vol 2 cassette	£2.99	*2199*	☐
Cheat it again, Joe Vol 2 5.25" disc	£4.99	*2223*	☐
Cheat it again, Joe Vol 3 cassette	£2.99	*2266*	☐
Cheat it again, Joe Vol 3 5.25" disc	£4.99	*2267*	☐

Arcade Game Creator (DFS only)

Cassette & Manual	£9.95	*2268*	☐
5.25" disc (40T) & Manual	£11.95	*2269*	☐
5.25" (80T) & Manual	£11.95	*2270*	☐

Add £2 for Europe & Eire /£5 Overseas

DTP Yearbook

	£9.95	*0505*	☐

Add £2 for Europe & Eire/£5 Overseas

Summer Collection *(See page 116)*

NEW

5.25" disc (40T)	£19.95	*2120*	☐
5.25" disc (80T)	£19.95	*2122*	☐

Add £3 for Europe & Eire/£6 Overseas

Superior Selection *(See page 117)*

NEW

	Tape			5.25"			3.5"		
A Question of Sport	£9.95	*2200*	☐	£10.95	*2201*	☐	£14.95	*2202*	☐
Pipeline	£7.95	*2203*	☐	£8.95	*2204*	☐	£10.95	*2205*	☐
By Fair Means of Foul	£7.95	*2206*	☐	£8.95	*2207*	☐	£10.95	*2208*	☐
The Last Ninja	£7.95	*2209*	☐	£8.95	*2210*	☐	£10.95	*2211*	☐

Add £2 per program Europe & Eire / £5 Overseas

Lancelot

BBC Master disc	£14.95	*2192*	☐

Add £2 for Europe & Eire/£4 Overseas

Mini Office II

£ p

(See page 67)

Available For:	**MO2**	**Book**	**Example Disc**	**Price**	**Code**	**Please Tick**
Tape users	●	–	–	£14.95	*2368*	☐
Model B, B+ (40T disc)	●	–	–	£16.95	*2369*	☐
Model B, B+ (80T disc)	●	–	–	£16.95	*2370*	☐
Master (5.25" 40T disc)	●	–	–	£19.95	*2283*	☐
Master (5.25" 80T disc)	●	–	–	£19.95	*2028*	☐
Tape users	●	●	–	£19.95	*2271*	☐
Model B, B+ (40T disc)	●	●	–	£21.95	*2272*	☐
Model B, B+ (80T disc)	●	●	–	£21.95	*2273*	☐
Master (5.25" 40T disc)	●	●	–	£24.95	*2281*	☐
Master (5.25" 80T disc)	●	●	–	£24.95	*2276*	☐
Model B, B+ (40T disc)	●	●	●	£29.95	*2274*	☐
Model B, B+ (80T disc)	●	●	●	£29.95	*2275*	☐
Master (5.25" 40T disc)	●	●	●	£32.95	*2282*	☐
Master (5.25" 80T disc)	●	●	●	£32.95	*2277*	☐

Binder

	£4.95	*2221*	☐

Add £4 for Europe & Eire/£6 Overseas

Dust Covers

BBC B & B+	£3.95	*2220*	☐
BBC Master	£3.95	*2222*	☐
BBC Master Compact	£3.95	*2224*	☐

Add £1 for Europe & Eire/£2 Overseas

Books

The Complete BBC Computer User Handbook	£14.95	*2163*	☐
The Advanced Reference Manual for the BBC Master	£16.95	*2164*	☐

Add £2 per book for Europe and Eire, £5 for Overseas

Forth Rom

	£19.95	*2046*	☐

Add £4 per Rom for Europe & Eire £15 Overseas

Time & Magik

80T disc	£14.95	*2160*	☐

Add £2 for Europe & Eire/£4 Overseas

Fun School 2 (DFS only)

(See page 74)

	Tape £9.95		5.25" disc (40/80T) £12.95	
Under 6s	*2239*	☐	*2240*	☐
6-8 year olds	*2242*	☐	*2243*	☐
Over 8s	*2245*	☐	*2249*	☐

Add £2 for Europe & Eire/£4 Overseas

Morley Teletext Adapter *(see page 101)*

Teletext Adapter (40T utilities disc) + Design 7 Plus	£99.95	*2157*	☐
Teletext Adapter (80T utilities disc) + Design 7 Plus	£99.95	*2158*	☐
Power Supply	£9.95	*2054*	☐

Add £4 for Europe and Eire, £7 for Overseas

Ten of the Best Educational programs

(DFS only) *(see page 128)*

Cassette	£5.95	*2189*	☐
5.25" Disc (40T)	£6.95	*2190*	☐
5.25" Disc (80T)	£6.95	*2191*	☐

Fun School and Nursery Rhymes

(see page 115)

Cassette	£9.95	*2090*	☐
5.25" Disc BBC B, B+ (40T)	£12.95	*2091*	☐
5.25" Disc BBC B, B+ (80T)	£12.95	*2092*	☐

Add £3 Europe & Eire / £6 Overseas

➡ ➡ ➡ ➡ ➡ ➡ ➡ ➡ ➡ **TOTAL** ______

Payment: please indicate method (✓)

☐ Cheque/Eurocheque made payable to Database Publications Ltd.

☐ Access/Mastercard/Eurocard/Barclaycard/Visa

Expiry Date ____ / ____

No. ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Name ______________________ Signed ______________________

Address ____

______________________ Postcode ______________________

Daytime telephone number in case of queries ______________________ MU8

Send to:
Database Direct
FREEPOST, Ellesmere Port,
South Wirral L65 3EB
(No stamp needed if posted in UK)
Please allow up to 28 days for delivery

Order at any time of the day or night

Tel: 051-357 2961

Fax Orders: 051-357 2813	*Orders by Prestel:* Key *89, then 614568383	*MicroLink/Telecom Gold* 72:MAG001

Don't forget to give your name, address and credit card number

EPROMS, 8271 Etc.

	Ex VAT	Inc VAT
1-9 27128 250nS 21V	5.00	5.75
10+ 27128 250nS 21V	4.40	5.06
1-9 2764 250nS	2.77	3.19
1-9 27256 250nS	4.80	5.52
1-9 8271 controller	38.26	44.00
10+ 8271 controller	34.00	39.10
1-9 6264 LP 150nS	6.00	6.90
Acorn 8271 DFS	45.22	52.00
Acorn 1770 DFS	45.22	52.00
Turbo upgrade	98.78	113.50
Peartree MR8000	47.83	55.00
RISC OS upgrade	29.00	33.35

ROMS/SOFTWARE

	Ex VAT	Inc VAT
Inter-Word	35.65	41.00
Inter-Base	46.96	54.00
Wordwise Plus	37.39	43.00
MEGA 3	71.30	82.00
Spell Master	40.00	46.00
Artisan	30.43	35.00
Cares Toolkit	30.43	35.00
ViewStore	35.65	41.00
OverView I & II	68.70	79.00

Phone for BBC/Archimedes Software catalogue 100's of titles inc. Edu.

MONITORS

	Ex VAT	Inc VAT
Philips CM8802	173.04	199.00
Philips CM8852	216.52	249.00
Philips BM7502 Green	62.61	72.00
Philips BM7522 Amber	73.91	85.00
Philips TV Tuner	56.52	65.00
Taxan KX Amber	82.61	95.00
Taxan KX1201 Green	68.69	79.00
Microvitec 1431	173.04	199.00
Microvitec 1451	216.52	249.00

(Prices inc. BBC Cable)

MASTER/ARCHI

	Ex VAT	Inc VAT
512 CO. Processor	173.04	199.00
Master 128K Micro	404.35	465.00
Archimedes from	695.65	800.00
Master Compacts from	330.43	380.00
Master Cartridges	8.65	9.95
Reference Manuals	14.00	14.00
View 3/View Sheet Guides	9.00	9.00
Master & B Dust Covers	3.00	3.45
BBC B's from	152.17	175.00

Big discounts on Master/Archi Systems.
Educational Discount prices phone.

Philips CM8833

with BBC cable

£225.00 (£195.65+VAT)

VOLTMACE JOYSTICKS

Delta 14B single	12.61	14.50
Delta 3B single	11.26	12.95
Delta 3B twin	17.35	19.95

Panasonic KXP1081

with BBC cable & paper

£155.00 (£134.78+VAT)

with Screen Dump, 2m cable + paper

£160.00 (£139.13+VAT)

	Exc VAT	Inc VAT
KXP Fabric ink ribbon	3.74	4.30
KXP View Printer Driver	7.83	9.00
KXP Control/Dump Rom	13.00	14.95

PANASONIC KXP1180

with BBC cable & paper

£179.00 (£155.65+VAT)

PANASONIC KXP1124

(24 Pin)

with BBC cable & paper

£299.00 (£260.00+VAT)

CITIZEN 180E

with BBC cable & paper

£149.00 (£129.57+VAT)

Taxan KP815

With BBC cable & paper

£175.00 (£152.17 + VAT)

CITIZEN 120D

with BBC cable & paper

£135.00 (£117.39+VAT)

CANON PW1080A

with BBC cable & paper

£159.00 (£138.26 + VAT)

STAR LC10

with BBC cable & paper

£189.00 (£164.35+VAT)

EPSON LX 800

With BBC cable & paper

£179.00 (£155.65 + VAT)

STAR LC10 Colour

with BBC cable & paper

£239.00 (£207.83+VAT)

EPSON LQ500

With BBC cable & paper

£315.00 (£273.91 + VAT)

STAR LC2410

with BBC cable & paper

£315.00 (£273.91+VAT)

PRINTERS/CABLES/Etc.

	Ex VAT	Inc VAT
Canon A55 (17"w)	260.00	299.00
Epson LQ850	465.22	535.00
Juki 2200 D/W	233.91	269.00
Juki 6200 D/W	286.09	329.00
1.5m (4 foot) BBC cable	4.00	4.60
2.0m (6 foot) BBC cable	6.00	6.90
Compact printer cable	6.00	6.90
IBM/Archimedes cable 1.8M	6.00	6.90
LX/LQ Sheet Feeder	62.61	72.00
LC10/LC2410 Sheet Feeder	51.30	59.00
2 way Printer Switch	18.00	20.70
Printer Dust Covers	4.00	4.60

PRINTER RIBBONS

	Ex VAT	Inc VAT
LX800 & FX800 Print Ribbon	2.30	2.65
LC10 Print Ribbon	4.00	4.60
120D Print Ribbon	4.00	4.60
Taxan/Canon Ribbon	3.22	3.70
Juki 6100 Print Ribbon	1.30	1.50

Phone for full range 100 + original & Compatible ribbons + Bulk discounts

DISKETTES (100% Error free)

(lifetime warranty)	Ex VAT	Inc VAT
10 Banana Reversible	8.65	9.95
10 3.5" D/S 135tpi	7.39	8.50
50 3.5" D/S 135tpi	34.80	40.00
100 3.5" D/S 135tpi	67.83	78.00
10 96tpi D/S D/D in box	5.17	5.95
50 96tpi D/S D/D in boxes	17.17	19.75
100 96tpi D/S D/D in boxes	32.09	36.90
50 Disc Box 3.5 " + lock	5.17	5.95
50 Disc Box 5.25" + lock	5.65	6.50
100 Disc Box 5.25"+ lock	6.52	7.50

5¼ DISC DRIVES

	ExVAT	InVAT
Cumana CSX100 40T	74.78	86.00
Cumana CSX400 40/80T	89.57	103.00
Cumana CDX 800S 40/80T	175.65	202.00
Cumana CD800S 40/80T	195.65	225.00
MD400A 400k No PSU 40/80T	78.26	90.00
MD400B 400k & PSU 40/80T	88.70	102.00
MD802C 800k No PSU 40/80T	156.52	180.00
MD802E 800k & PSU 40/80T	169.57	195.00
MD802D 800k & stand 40/80T	190.43	219.00

Phone for Hard discs + Torch

Phone for our best price before placing your order
EDUCATIONAL & GOVERNMENT ORDERS WELCOME
All products have a 12 month no quibble guarantee
Prices subject to variation without prior notification
We are closed Saturday afternoons
Postage 92p (80p + VAT) Securicor £6.90 (£6.00 + VAT)

WeServe

Larger items delivered by Securicor

Micro Dept.
128 West Street,
Portchester,
Hants.
PO16 9XE
Tel: 0705 325354

REAL TIME
CONTROL APPLICATIONS

From Paul Fray Ltd

For School, Business, Home or Laboratory

SPIDER *The Software*

Fifty additional keywords expanding BASIC's control over the User Port, Serial Port and keyboard by invoking BASIC procedures from external events.

- *Foreground/Background processing*
- *ROM/RAM combination takes no memory*
- *Leaves BASIC programs unaffected*
- *Easy to install with no soldering*

— FROM £65 —

Archimedes version – Arachnid Now available

TERMITE *The Hardware*

- *Eight configurable input/output lines*
- *Status indicators for each line*
- *Outputs rated at 2A, 5 to 30V DC*
- *Opto-isolated and fused for safety*
- *Fully compatible with SPIDER*
- *Comprehensive manual including driver utilities*
- *Ideal for driving motors, lamps, sensors etc.*

— ONLY £89 —

Prices inclusive of VAT. Please add £3 for p&p

We also supply a full range of industrial digital, analogue and serial cards for use with SPIDER. For more information on any Paul Fray product please telephone (0223) 66529

(Trade Enquiries Welcome)

Paul Fray Ltd, Willowcroft, Histon Road, Cambridge CB4 3JD

DATECH ASSOCIATES LTD

Datech House, 3 Wattlesye,
Collingham Bridge, LS22 5AZ
Tel: 0937 74661/2 Telex: 557346

VISA

5.25" DATECH BRANDED DISKETTES

QTY	20+	50+	100+	200+
DS/DD 48TPI	40p	33p	29p	26p
DS/DD 96TPI	45p	38p	33p	30p
DS/HD 1.6Meg	93p	82p	75p	69p

All Disks 100% Guaranteed
All diskettes supplied in a plastic library case

3.5" DATECH BRANDED DISKETTES

QTY	20+	50+	100+	200+
DS/DD 135TPI	82p	80p	78p	77p
DS/HD 2Meg	£3.24	£2.92	£2.72	£2.53

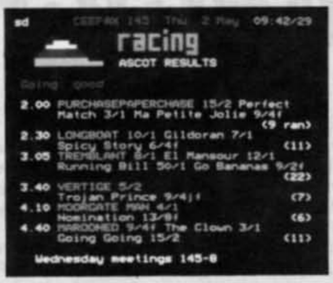
All Disks 100% Guaranteed
All diskettes supplied in a plastic library case

LASER TONERS

QTY	1-5	6-10
Hewlett Packard Laserjet I	£58.75	£57.40
Hewlett Packard Laserjet II	£59.40	£58.90

Ring for price on larger quantities

Government, Education and PLC's orders welcome
To Order Ring 0937 74661/2



```
sd      CEEFAX 145  Thu  2 May  09:42/29
             racing
             ASCOT RESULTS
Going: good

2.00 PURCHASEPAPERCHASE 15/2 Perfect
     Match 3/1 Ma Petite Jolie 9/4f
                                (9 ran)
2.30 LONGBOAT 10/1 Gildoran 7/1
     Spicy Story 6/4f              (11)
3.05 TREMBLANT 8/1 El Mansour 12/1
     Running Bill 50/1 Go Bananas 9/2f
                                   (22)
3.40 VERTIGE 5/2
     Trojan Prince 9/4j!            (7)
4.10 MOORGATE MAN 4/1
     Nomination 13/8f               (6)
4.40 MAROONED 9/4f The Clown 3/1
     Going Going 15/2              (11)

  Wednesday meetings 145-0
```

◀ From Page 106

```
  270 ENDPROC
  280 DEFPROCfindpag
  290 PROCoscli("PAGE "+STR$(page%))
  300 PROCoscli("DATA "+STR$"(store%))
  310 ENDPROC
  320 DEFPROCdisplaypage(store%)
  330 s%=store%
  340 REPEAT
  350 s%=s%+42
  360 row%=s%?1:IFrow%>27 s%?1=0
  370 IFrow%=27 AND FNdeham(s%?2)<>0 row
%=1
  380 UNTIL(row%=27)OR(s%>=store%+((rows
%+2)*42))
  390 IFrow%=27 crc%=((s%?40)*256)+s%?41
  400 IF ats%=TRUE:PROCoscli("DISPLAY "+
STR$"(store%)):ELSE PROCscreen(store%)
  410 VDU23;8202;0;0;0;
  420 ENDPROC
  430 DEFPROCoscli(command$)
  440 $line%=command$
  450 X%=line% MOD256:Y%=line% DIV256
  460 CALL&FFF7
  470 ENDPROC
  480 DEFPROCsetvars
  490 DIM crc%(20),no%(20),line% 20
  500 DIMlasttime$(20),row$(24)
  510 rows%=27
  520 DIM store% &800
  530 ENDPROC
  540 DEFPROCheading
  550 PRINT'CHR$148;STRING$(39,"s");
  560 VDU&94,&9D,&93:PRINTSTRING$(7,CHR$
&FC);:VDU&BC,&AC,&AC,&B4,&20,&20,&A8,&EC
,&AC,&AC,&B4,&20,&20,&A8,&EC,&AC,&AC,&B4
,10,13
  570 VDU&94,&9D,&93:PRINTSTRING$(7,CHR$
&FF);:VDU&B5,&EA,&FF,&B5,&B7,&E3,&FB,&EA
,&20,&FB,&B5,&B7,&E3,&FB,&EA,&20,&B1,&B5
,&B7,&EB,&A3:PRINTSTRING$(7,CHR$&FF)
  580 VDU&94,&9D,&93,&AF,&AF,&AF,&2F,&AF
,&AF,&AF,&AD,&AC,&AC,&A5,&B5,&A8,&EF,&AA
,&AC,&AC,&A5,&B5,&E8,&FF,&AA,&AC,&AD,&A5
,&B7,&E8,&A2:PRINTSTRING$(7,CHR$&FF)
  590 PRINTCHR$148;CHR$157;CHR$147;SPC10
;"££££   ####   ";STRING$(11,"#")
  600 PRINTCHR$148;STRING$(39,",");
  610 PRINTSPC9;" Page Update Indicator"
  620 PRINTCHR$148;STRING$(39,",");
  630 FORA%=1TO9:VDU148,157,10,13:NEXT
  640 PRINTCHR$148;STRING$(39,"s");
  650 VDU&93,&FC,&BC,&EC,&AC,&AC,&BC,&EC
,&BC,&EC,&94,&FC,&FC,&BC,&AC,&FC,&AC,&AC
,&FC,&BC,&AC,&FC,&BC,&AC,&FC,&AC,&FC,&AC
,&EC,&FC,&93,&FC,&BC,&AC,&FC,&AC,&FC,&FC
,&FC,&FC
  660 VDU&93,&FF,&B5,&EA,&B5,&EA,&B5,&EA
,&B5,&EA,&FF,&94,&FF,&A0,&B5,&EA,&A0,&A5
,&FA,&A0,&A5,&EA,&A0,&F5,&FA,&A0,&FF,&A0
,&EF,&93,&FF,&FF,&20,&F5,&FA,&20,&B7,&EB
,&FF,&FF
  670 VDU&93,&FF,&B5,&EA,&B5,&EA,&F5,&AA
,&A5,&FA,&FF,&94,&FF,&A0,&B5,&EA,&A0,&B5
,&EA,&A0,&B5,&EA,&A0,&B7,&EB,&A0,&FF,&A0
,&FF,&93,&FF,&FF,&20,&B7,&EB,&F0,&B1,&E2
,&FF,&FF
  680 VDU&93,&AF,&AD,&AE,&AD,&AE,&AF,&AD
,&AE,&AF,&94,&AF,&AF,&AD,&AC,&AF,&AC,&AD
,&AE,&AC,&AD,&AE,&AD,&AC,&AF,&AC,&AE,&AC
,&AE,&AF,&93,&AF,&AD,&AC,&AF,&AF,&AD,&AE
,&AF,&AF
  690 PRINTCHR$148;STRING$(39,"£");
  700 ENDPROC
  710 DEFPROCupdate
  720 sub%=FNsubpage(store%)
  730 IFFNcheckCRC(store%)=FALSE GOTO760
  740 IFcrc%(sub%)=0 crc%(sub%)=crc%:END
PROC
  750 IFcrc%(sub%)<>crc% PROCsound:crc%(
sub%)=crc%
  760 ENDPROC
  770 DEFPROCsound
  780 FORS%=1TO4:SOUND1,-15,53,7:SOUND1,
-15,69,7
  790 SOUND1,-15,81,7:SOUND1,0,0,15:NEXT
  800 no%(sub%)=no%(sub%)+1
  810 lasttime$(sub%)=FNtime:PRINTTAB(18
,24);"Update ";no%(sub%);":"lasttime$(su
b%);
  820 ENDPROC
  830 DEFFNcheckCRC(store%)
  840 A%=&7A
  850 X%=line% MOD256:Y%=line% DIV256
  860 line%?0=23
  870 line%?1=(store%) MOD256
  880 line%?2=(store%) DIV256
  890 CALL&FFF1
  900 answer%=line%?3
  910 IF answer%=1 =TRUE ELSE =FALSE
  920 DEFFNsubpage(store%)
  930 sub%=store%?4
```

This is one of hundreds of programs now available FREE for downloading on MicroLink

```
  940 IFsub%=&7F sub%=0
  950 IFlasttime$(sub%)="" lasttime$(sub
%)=FNtime
  960 PRINTTAB(0,24);"Page "page%;"s";su
b%;TAB(18,24);"Update ";no%(sub%);": "la
sttime$(sub%);
  970 =sub%
  980 DEFFNdeham(byte%)
  990 ?line%=25:line%?1=byte%:X%=line% M
OD256:Y%=line% DIV256:A%=&7A:CALL&FFF1
 1000 =line%?2
 1010 DEFFNtime
 1020 ?line%=21:X%=line% MOD256:Y%=line%
 DIV256:A%=&7A:CALL&FFF1
 1030 line%?9=&D
 1040 =$(line%+1)
 1050 DEFPROCscreen(s%)
 1060 LOCALrow%,mag%,a%,temp%
 1070 FORa%=1TO24:row$(a%)=STRING$(40,"
"):NEXT
 1080 REPEAT
 1090 mag%=s%?0:row%=s%?1
 1100 IFrow%>23 ORrow%<1 GOTO1150
 1110 FORa%=(s%+2)TO(s%+41):?a%=(?a%)OR&
80:NEXT
 1120 temp%=s%?42:s%?42=&D
 1130 row$(row%)=$(s%+2)
 1140 s%?42=temp%
 1150 s%=s%+42
 1160 UNTILmag%=&FF OR mag%=0
 1170 FORa%=1TO22:IF INSTR(row$(a%),CHR$
(141))<>0 row$(a%+1)=row$(a%):a%=a%+1
 1180 NEXT
 1190 CLS:PRINT:dh%=0
 1200 FORa%=1TO23
 1210 PRINTrow$(a%);
 1220 NEXT
 1230 ENDPROC
 1240 DEFFNatsversion
 1250 *TTXON
 1260 T%=TIME:REPEAT:UNTILTIME>T%+200
 1270 A%=&7A:line%?9=0:?line%=21:X%=line
% MOD256:Y%=line% DIV256:CALL&FFF1
 1280 IFline%?9=&D atsver%=2 ELSE atsver
%=1
 1290 line%?3=&FF:?line%=17:CALL&FFF1
 1300 IFline%?3=&FF adaptor$="Acorn" ELS
E adaptor$="GIS"
 1310 IFadaptor$="Acorn" AND atsver%=1 =
FALSE ELSE =TRUE
 1320 ONERROROFF
 1330 *HOFF
 1340 ONERROROFF
 1350 MODE7
 1360 *TTXOFF
 1370 END
```

Get it right!

```
  10 =    0 0
  20 =    0 0
  30 =    0 0
  40 = 9719 9
  50 = 96F4 4
  60 = 8AFC 0
  70 = EFB5 C
  80 = FF29 D
  90 = A07C 1
 100 = BFBA E
 110 = 7EEB C
 120 = 73D6 A
 130 = 9386 4
 140 = E014 0
 150 = 9719 7
 160 = 4DDA E
 170 = 803E 5
 180 = 8858 9
 190 = 9BE4 0
 200 = 5F11 C
 210 = 5943 8
 220 = 5703 1
 230 = 6B1C 5
 240 = 8F61 E
 250 = 4641 5
 260 = EFB9 C
 270 = ED0F 6
 280 = 934D 3
 290 = 301B D
 300 = B07C D
 310 = ED0F 9
 320 = ADBA F
 330 = A27E C
 340 = BFBA A
 350 = DFCF E
 360 = 9A8D F
 370 = 5B35 8
 380 = 77DC 1
 390 = 9462 0
 400 = 450D 8
 410 = F716 D
 420 = ED0F E
 430 = B58A 5
 440 = 53C5 B
 450 = E128 B
 460 = EBB2 6
 470 = ED0F A
 480 = 128F E
 490 = 515D E
 500 = 1F8E 0
 510 = 516C F
 520 =  647 1
 530 = ED0F 0
 540 =  213 2
 550 = 14BD 3
 560 =  DDF 0
 570 = EAE1 F
 580 =  2AA A
 590 = 11B5 1
 600 = 1AF1 1
 610 = DDA4 0
 620 = 1AF1 F
 630 = 4AAA 6
 640 = BB24 0
 650 = E0B2 1
 660 = 4D11 6
 670 = B08D 5
 680 =   64 B
 690 = 3B5F 3
 700 = ED0F 0
 710 = F307 1
 720 = 3BC0 8
 730 = 4390 7
 740 = 2AD9 0
 750 = 6B5D C
 760 = ED0F 6
 770 = F80F B
 780 = 80D1 4
 790 = 4AED F
 800 = B0C8 6
 810 = F73B E
 820 = ED0F E
 830 = E470 5
 840 = E1BD 8
 850 = E128 A
 860 = 9E40 A
 870 = 6571 B
 880 = 6B3C B
 890 = 8B74 0
 900 = 7028 1
 910 = C57F 4
 920 = 628A 0
 930 = 2EF5 0
 940 = 31D6 F
 950 = 587B F
 960 = C6FD 1
 970 = DE4A 8
 980 = 7251 4
 990 = 288C D
1000 = BB5C 9
1010 = 859E C
1020 =  105 E
1030 = ACF0 9
1040 = 51C6 E
1050 = 3CEB C
1060 = 85C8 D
1070 = 2203 5
1080 = BFBA 0
1090 = A4EA 4
1100 = A1E5 8
1110 = 640C 2
1120 = 1573 F
1130 = 5442 A
1140 = 91E0 B
1150 = DFCF F
1160 = D48D 7
1170 = 4882 E
1180 = 2C83 5
1190 = 3A9E D
1200 = 806E 0
1210 = B035 6
1220 = 2C83 6
1230 = ED0F 0
1240 = 6647 C
1250 = D363 E
1260 = DBA9 5
1270 = A90A 3
1280 = 6AAD 3
1290 = 297D 1
1300 =  9FE C
1310 = 444C E
1320 = BE32 6
1330 = 1BB1 7
1340 = BE32 E
1350 = 8AFC 1
1360 = 39B5 5
1370 = FD2E 5
```

MICRO USER CLASSIFIEDS

● BBC software for sale. Including utilities, games and books. For details phone Mike on Ingrebourne 73263.

● AMX Art with AMX Mouse £25, Prism 2000 modem £25, both hardly used. Tel: Alan 0484 846126 (Yorks).

● Quest Paint, mouse with fonts disc and mat, boxed £45. Tel: 0327 61261.

● Master Compact 25 games, Mini Office, Minidriver, manuals all £40 ono, including postage. Tel: 0706 817570.

● Archimedes 310+, colour Monitor, printer, Risc OS, all for £900 ovno. Buyer collects. Ring Bristol 652759, ask for Mark.

● Render Bender Upgrade, + stunning 3D pictures and animations. Telephone Simon 0829 260476, evenings.

● Archimedes 305 with IMB ram and Risc OS £750. Ifel 4 slot Backplane £40. Phone: Chesterfield 270730 after 6pm.

● For sale. BBC B games, now unused, send sae to 17st Augustines Mansions, Bloomburg Street, London, SW1V 2RG, Hurry!

● Wanted. Old program power game "Beeb Tote". Phone: 0705 263980 after 5.30pm, ask for Damon.

● Minerva Home Accounts (Archimedes) New, boxed useless so selling for £30 ono 0908 321763.

● Electron Plus 1, Plus 3, PMS–E2P, View/Sheet, T2P3, recorder, mint. £230. 0793 641309.

● BBC B, 1.20S DFS, View 2.1, 80T drive, hi-res green screen, printer, games, blank discs, handbooks, mags, surge protector, £300. Tel: 0242 510119.

● BBC B computer, colour monitor, Viglen disc drive, Sanyo tape recorder, custom made stand, full set up of Input magazines, good selection of manuals and games. First serious offer taken. Tel: 0263 823371.

● Master 128, Acorn Z80 2nd Processor, 5.25in drive, 3.5in drive, Data & Power Duck, Iso Pascal roms, all manuals and software £550 ono. Tel: Sheffield (0742) 332160 (Evenings).

● BBC B Issue 7, Watford MKII double density DFS interface, Welcome Guide, user manual, disc drive, View, Viewsheet plus additional software/manuals. Hardly used £270. Please phone 0252 622793 evenings/weekends.

● Executive personal computer/printer. desk with lockable keyboard drawer. Mounted on lockable casters, sliding side shelf, vgc £190 ono. Cost over £330 0621 740637 (Evenings).

● BBC B Issue 7, Challenger 3 in 1 disc drive, Intergra-B expansion board, Interword, ISO Pascal, Beebug C, plus extras. Offers for the lot or will split. Mr R. Chandler, 304 Camp Hill Road, Nuneaton, Warks CV10 OJW

● BBC B, DDFS, 32k Shadow, rom-Bd, 16k bat-ram, joystick, dual-DS 40T drives, software, 8 roms, £250. Torch Graduate second processor for BBC B 8088, 256k ram, twin drives MSdos 3.2 £100. Tel.0664 69119

● BBC B, Viglen case, STL 256k, DFDC, DDFS, RTC, two 80/DSDD, mono, £425. 6502 SP, Quinkey, WW+, Interword, £30 each. 01-607 8325.

● Master 512k, colour Microvitec monitor, twin 5.25/3.5in drives with Plinth. Much software, Many roms and manuals. £650 ono. Tel: 0626 61333 after 5pm.

● BBC B disc drive, joystick, tape recorder, £800 of software incl Elite, Barbarian, excellent condition. Worth £1,000 sell for £350. Tel: 01-393 1833 after 7pm.

● BBC OS1.2 with data recorder, tape games (Elite & Revs), box, joystick. Watford 3.5in/5.25in double switchable drive & MkII DDFS, Acorn's ADFS, discs (Firetrack & Bonecruncher) books and magazines. Telephone 0302 326084 Doncaster £420.

● BBC B OS1.20, Solidisk: DFS 1770 and 32k sideways ram. £195 Tel: 0268 759268.

● Brand new Watford CS400S 40/80T DS disc drive with PSU £60. Also Archimedes disc drive interface £15. Tel: 0493 664563.

● Master Turbo, AMX Mouse Mk3, touchpad, joystick, manuals £300 ono. Tel: 0424 882347 Hastings.

● BBC B OS 1.2, 1770(2), Acorn DFS, dual 40/80T DS drives, replay MkII and games, 32k SWR + 18 roms, fantasic software, leads, manuals, dust cover, datacorder, latest magazines OIR £400. For details: Bucks 0628 662243 (Evenings).

● BBC B +64k 40/80T DS drive, roms including Wordwise+, GXR, Dumpout 3 disc, books and magazines all boxed with manuals. Excellent condition £400. Phone 09278 3130.

● BBC B, Acorn DFS, ATPL sideways board, Viglen 40/80T disc drive, Philips green screen monitor, Shinwa 9 pin printer with spare ribbon, books, magazines. £375 ono. Tel: 0436 72450 (evenings)

● BBC B OS 1.2, Acorn DFS, View, Viewsheet, Opus twin DS/DD 40/80T drive, 14in Microvitec colour monitor, Acorn tape, 32 tape games, 6 disc games including Exile and Cholo, cost £1,200 will sell for £550 ono. Ring Ian on 0772 612491 after 4.30pm

● Viglen 28Mb Winchester, ADFS, £300 BBC B DFS, Watford ram/rom board, Mini Office II rom, £200. 6502 second processor, £100. ISO Pascal, AMX Mouse (+super art) Music 500, £20 each. M/C monitor £10, Sentinal, Thrust, Speech, Deathstar, Revs + 4 Track, Elite, £1 each. All items boxed with manuals. Tel: 01-660 2842 after 6pm.

● Master Compact, colour monitor, AMX Mouse, Super Art, two FX80 compatible printers, few discs, Elite etc. View rom, sensible offers invited. Phone Shaun on 0733 71801 after 6pm.

● BBC B, DDFS, 40/80T DDDS disc drive, RGB monitor, rom/ram board, 3x16k SWR, AMX Super Art + Mouse, Zif Socket, Wordwise+, 30+ discs, software, cassette recorder, £450 ono Tel: 0703 464667.

● Lots of BBC games for sale, bulk or separately. Sae to: S. Hall, 5 Castle Close, Henbury, Bristol, BS10 7QU.

● Master 128, Microvitec 1451 monitor, Cumana CS400S drive, Voltmace joysticks, mouse, Super Art, Max Relay board, £200+ of games, many original. Various other discs, boxed as new all for £950 ono Tel: 0261 32524.

● BBC B Issue 7, DS40/80T Drives, 6502 second processor, Music 500, Modem 2000, books, disks, roms, + more £425 ono. Tel: Southend 0702 330815.

● Archimedes 310M colour, good condition, includes MSdos, software, games, £1,000 ono. Also Star LC-10 printer (colour) £170. Phone: 0224 647509 (Evenings).

● BBC B, twin Opus 40/80T drives, Viglen PC casing, Microvitec colour monitor, Sideways ram, Digimouse, joystick, many roms, 90 discs, books, accessories, £500. Torch Z80 co-processor + software + manuals £90 Miracle WS2000 + Micronet rom £60 . Offers considered. Tel: 0924 469259.

● Archimedes 310 with Risc OS and podule backplane. Optionally 20Mb Acorn hard disc, Watford real time

PLEASE PRINT THIS AD IN THE NEXT MICRO USER

Name______________________________

Address______________________________

Cheque enclosed for £______
(minimum £2 for 10 words)

I certify that any software offered for sale is original and not a copy

Signed____________________

POST TO: Micro User Classifieds, FREEPOST, Macclesfield, Cheshire SK10 4YB.

Has upgrading your BBC Micro given you hardware you no longer need?

Or have changing interests left you with unwanted software?

This is THE place to advertise your surplus items.

Our 179,000 readers are always on the lookout for a bargain and this is the first place they'll look!

An added bonus!

Your advert will be automatically displayed on MicroLink, the electronic mail service operated in association with Telecom Gold. This means it will be seen by thousands of computer enthusiasts who can send an instant response.

digitiser etc. £950 + extras. Tel: 01-874 6877.

● Master 128, Cumana double-single sided disc drive – 40/80 switchable, Kaga colour monitor (medium resolution). Many books and software £550 the lot. Tel: 021-357 6968.

● Dual DS 40T drives with PSU plus uncased drive as spare. All perfect £110 ono. Tel: 0252 514101 (Evenings).

● BBC B, Torch 2nd processor dual drive, monitor, simple printer, Wordstar "Perfect" software. £550 ono. Tel: 0272 682108.

● Archimedes A310 colour monitor, backplane, I/D podule, external disc interface, rom podule, reference manuals, Risc OS. £950 Tel: 01-743 1579 (Evenings).

● Opus DDos 3.45 disc interface, complete kit, £30. Tel: 0303 44085.

● Master 128k with 512 board, Beebug modem, dual/DS 40/80 drives/Plinth, 20Mb hard drive, Master rom board, Morley teletext adaptor, Microvitec colour monitor, eprom programmer and eraser, two quad cartridges, AMX Mk3 Mouse, Super Art, Stop Press, Max, user port splitter, Genie, Viewspell, Hyperdriver, software including: Extra Extra, Gem, Dabhand 512 Shareware, plus games, utilities and books. £1,600 ono. Split possible. Phone: 0609 779100.

● Wanted. Information ICL Perq Computer Nigel. Tel: Crawley 0293 513354.

● Epson MX80 printer with manual and spare ribbons. Good condition. £50. Tel: 0602 335317 (Evenings).

● BBC Master Compact, TV modulator, manual, software, excellent condition £270 ono. Tel: 09905 6646 (Evenings).

● Master 128, 400k DSDD, Amber monitor, joystick, software, £370. Tel: 01-947 2079.

● 128k Watford rom/ram board, all options installed. Still boxed £80 ono. Tel: 0532 781091.

● Solidisk 2 meg 128k board plus rom manager £27.50. Tel: Havant 474938.

● Watford Beeb video digitiser, as new, cost £125.35, for £65. Tel: 069 76530.

● BBC B Issue 7, Acorn DFS £210, Microvitec medium resolution monitor £100. many roms including Replay, Wordwise, games (tape and disc), books. Will sell for £600 or split. Tel: 0633 681090 (Evenings).

● Master 512 in Viglen PC case with dual 40/80 disc drives £550. 28 meg hard drive £300. Microvitec 1450 APMS £125. Viglen cartridge system, software, books A/U magazines etc. Tel: Yateley 872505 (Evenings).

● Archimedes 310M without monitor, approximately £400 of software (including IBM), vgc – £725. Delivered only to West Midlands area. Tel: 021-354 9481 (Evenings).

● Philips 12in green monitor with tilt and swivel base £50. Dabhand guide, Viewsheet, Viewstore with disc £10, Voltmace joystick 3B single £6. Tel: Parbold 4183.

● BBC B, Watford MkII DDFS +40/80 double sided drive, discs, storage box, data recorder, joystick, £200 games. covers, books etc. Great condition £250 ono. Tel: 0695 622199.

● BBC B DFS 40 track disc drive, Sony Trinitron colour monitor, 40 disc games, tape recorder, 10 tape games, rack, various manuals, immaculate condition. £650 ono. Tel: 01-346 7554.

● BBC Master with Turbo Board Pace DDDS colour monitor, Citizen printer, joysticks, software, Hybrid Music 5000-2000, £1,100. Package without Music System, £850, Tel: 0532 688804.

● Cumana 5.25in SS disc drive with PSU, C/W BBC ribbon cable. Cost £135, accept £80 ono. Tel: 02313 40426.

● Electron. Mint condition, boxed as new, all necessary leads, data recorder, manuals, 30 copies Electron User (+ binders), and £250 tape software, £165 ono. Phone: John 0935 22208 w/ends, 73378 weekdays.

● BBC kit, Philips green/black monitor, modem, Solidisk 4MHz 256k expansion roms inc manuals, Wordwise Plus, Viewstore, Intersheet, Interchart, software, Bank Manager, Cad, games. Tel: 094684509.

● BBC B DFS/ADFS, printer, B32 board: 32k SWR, 20k shadow ram, printer buffer, 40/80T disc drive, discs, manuals, magazines, £500 ono. Tel: Lymm 0925 75 6806.

● 80T DS disc drive and leads £55. Tape games £2 to £5: Elite, Hobbit, Repton. Repton 3 (disc). Tel: 0536 710981.

● Nightingale modem and Commstar 2, as new £80. Tel: Street 0458 43164 (Evenings).

● Archimedes 310M colour, 20Mb Winchester, 5.25in disc buffer, 4 slot backplane, £1,250 ono. Tel: 0895 621224.

● BBC B 1.2 DNFS 40/80T DS drive, cassette unit, Microvitec 1451, Vine replay, Viglen cartridge system, computer desk, tapes, discs, manuals, books. All vgc £325. Tel: Chesterfield 0246 826026 after 6pm.

● Wanted Z88 (The Micro User) articles also hardware for Z88. Tel: 040821870.

● BBC B Acorn 40 track drive, twin joysticks, many games, Disc doctor, Advanced User Guide, Advanced DFS Guide £285. Tel: 0933 318295.

● BBC and Electron games, cassettes and discs, sae to Jason Perry, Demerara, East Street, West Chiltington, West Sussex RH20 2JY.

● Master 128, RGB monitor, 40/80T double drive. Gis teletext adaptor, Overview. Star NL10 printer, reference manuals one and two. All handbooks. Accept £750. Tel: 01-326 0324 (Evenings and weekends).

● Archimedes 310, colour Risc OS with 5.25in external drive, PC emulator, 1st Word+, Pro-Artisan, Home accounts, Terramex, Enthary, Clares demo, dust covers, Parallez Printer lead, discs and magazines all for £1,100. Will split software, all only three months old, unwanted gift. Tel 01-883 5582.

● PMS Publisher, desktop publishing system, works within View, Wordwise, Interword 64k rom, Beebug Spellcheck II rom £35 including full documentation. Tel: 0437 87296.

● Compact+ brand new 5.25in disc drive, and disc box, TV mod, 20 games inc. Elite, Pipeline, disc based DFS II, mags £360. Phone: 0932342665 (Evenings).

● BBC B, cassette, Torch dual 80T discs, Wordwise, Replay (not installed) Plinth, loads of software, mags, joystick. £295. Phone 0734 475040 after 7pm. Reading area.

● Needed 16k ram 2x6264. Phone: 0252 26416 after 7pm. Christopher.

● Games galore. 40 track, Pipeline, Spycat, Summer Olympiad + many more! Tel: Bill 0923 777874.

● BBC B Issue 7 £225. BBC B+ £250. 40 track single-sided twin disc drive £50 ono. Phone: Simeon: 01-524-3121.

● BBC B, Watford DFS, double disc drive DS/DD, Inter-Word, Dumpout 3, Touchpad, manuals, orginals, Elite, Aviator, Xor + more £350 ono. Tel: 09274 20206.

● BBC B Issue 7, Acorn DFS, cassette recorder, joystick, tape games, £225 ovno. Tel: 0705 484412 (Evenings).

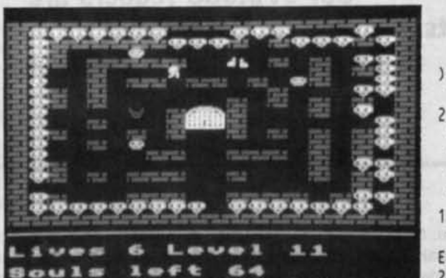
● Archimedes A310M, colour monitor. Risc OS fitted. Mint condition, 2 months old. £970 ono. Tel: Robert 0582 576923 (Evenings).

Ads will be accepted under the following conditions:

- This service is EXCLUSIVELY for the use of private readers. No trade ads will be allowed.
- To avoid encouraging software piracy, all ads will be carefully vetted before they are accepted.
- Ads can only be accepted on the form opposite (or a photocopy of it).
- There is no maximum to the number of words you include in your ad. If there is insufficient room on the form, continue on a separate sheet of paper.
- The cost is 20p per word, with a minimum of 10 words.
- *WE GUARANTEE your ad will appear in the next available issue of* The Micro User.

◄ From Page 51

```
  190 FORA=1TO18:M%(A)=1:MX%(A)=A:MY%(A)
=1:NEXT:FORA=19TO34:M%(A)=1:MX%(A)=18:MY
%(A)=A-17:NEXT:FORA=35TO52:M%(A)=1:MX%(A
)=(-A+53):MY%(A)=18:NEXT:FORA=53TO68:M%(
A)=1:MX%(A)=1:MY%(A)=(-A+70):NEXT
  200 VDU5:FORM%=1TO68:VDU26:MOVEMX%(M%)
*64,1023-32*MY%(M%):PRINTM$:S%(MX%(M%),M
Y%(M%))=M%+1:NEXT:M%=1:VDU4
  210 COLOUR3:FORB=0TO8STEP2:FORA=B TO19
-B:S%(A,B)=1:S%(A,19-B)=1:S%(B,A)=1:S%(1
9-B,A)=1:PRINTTAB(A,B)CHR$255;TAB(B,A)CH
R$255;TAB(19-B,A)CHR$255;TAB(A,19-B)CHR$
255:NEXT,
  220 FORA=2TO6 STEP4:S%(19-A,9)=0:S%(19
-A,10)=0:S%(A,9)=0:S%(A,10)=0:PRINTTAB(1
9-A,9)" ";TAB(19-A,10)" ";TAB(A,9)" ";TA
B(A,10)" ":NEXT
  230 FORA=4TO8 STEP4:S%(9,19-A)=0:S%(10
,19-A)=0:S%(9,A)=0:S%(10,A)=0:PRINTTAB(9
,19-A);" ";TAB(10,19-A)" ";TAB(9,A)" ";T
AB(10,A)" ":NEXT
  240 FORA=9TO10:S%(A,2)=0:PRINTTAB(A,2)
" ":S%(A,17)=0:PRINTTAB(A,17)" ":NEXT
  250 IFLEV%>3 PROCerode
  260 S%(9,9)=1:S%(10,9)=1:S%(9,10)=1:S%
(10,10)=1:PRINTTAB(9,9)G$:D%=0:M%=0:X%=9
:Y%=8:PROCP(2)
  270 DEATH%=LEV%-3:IFDEATH%>3 DEATH%=3
  280 IFDEATH%>0 M%(8)=-1:S%(MX%(8),MY%(
8))=-1:MN%=MN%-1:IFDEATH%>1 M%(43)=-1:S%
(MX%(43),MY%(43))=-1:MN%=MN%-1:IFDEATH%>
2 M%(26)=-1:S%(MX%(26),MY%(26))=0:MN%=MN
%-1
  290 IFLEV%>7 DEM%=LEV%-3:S%(MX%(54),MY
%(54))=-2:M%(54)=0:MN%=MN%-1:DX%=MX%(54)
:DY%=MY%(54):COLOUR3:PRINTTAB(DX%,DY%);C
HR$240
  300 IFLEV%<3 PROCwipesome
  310 PROCraise
  320 REPEAT
  330 IFINKEY-74PROCfi
  340 IFMN%>0 COLOUR1:PRINTTAB(11,24);MN
%;" "
  350 IFLEV%>9 AND RND(4)=1 PROCstomp
  360 IFTT%=3 TT%=0 ELSETT%=TT%+1
  370 T%=T%+1
  380 IFDED%=4 DED%=1:ELSEDED%=DED%+1
  390 OX%=X%:OY%=Y%
  400 E%=E%+10:IFE%>1280 E%=1280
  410 IFDEATH%>=DED% PROCdeath
  420 IFDEM%>0 AND TT%=0 PROCdem
  430 IFT%=100:T%=0:PROCP(0):D%=0:PROCP(
2)
  440 IFMN%<1PRINTTAB(9,9)"  ";TAB(9,10)
"  ";:S%(9,9)=0:S%(10,9)=0:S%(9,10)=0:S%
(10,10)=0
  450 PROCenergy
  460 IFE%<400 GOTO530
  470 IFINKEY-73ANDS%(X%,Y%-1)<>1:D%=1:P
ROCP(0):PROCF:Y%=Y%-1:PROCP(2)
  480 IFINKEY-105ANDS%(X%,Y%+1)<>1:D%=3:
PROCP(0):PROCF:Y%=Y%+1:PROCP(2)
  490 IFINKEY-67ANDS%(X%+1,Y%)<>1:D%=2:P
ROCP(0):PROCF:X%=X%+1:PROCP(2)
  500 IFINKEY-98ANDS%(X%-1,Y%)<>1:D%=4:P
ROCP(0):PROCF:X%=X%-1:PROCP(2)
  510 PROCspirits
  520 IFS%(X%,Y%)>1:E%=0
  530 UNTILE%<1 OR X%<11 AND X%>8 AND Y%
>8 AND Y%<11
  540 IFE%<1 PROCdead
  550 *FX15
  560 IFLI%<1 VDU28,0,19,19,0:CLS:COLOUR
2:PRINTTAB(5,10)"GAME OVER";TAB(4,13)"PR
ESS A KEY":A=GET:LEV%=13:GOTO580
  570 IF E%<1 E%=1280:GOTO130
```


Lives 6 Level 11
Souls left 64
SPIRIT
DEATH
DEMON
STOMPER
THE GATE
BY D HOPKINS
GUIDE YOUR ANGEL ROUND THE THIRTEEN LAYERS OF HELL AND PURIFY ALL SPIRITS

```
  580 NEXT
  590 IFLI%<1 LI%=5:GOTO120
  600 PROCwin
  610 GOTO120
  620 DEFPROCP(c%):COLOURc%:PRINTTAB(X%,
Y%)M$(D%,F%):E%=E%-4:ENDPROC
  630 DEFPROCF
  640 IFF%=0 F%=1:ELSEF%=0
  650 T%=0
  660 ENDPROC
  670 DEFPROCspirits:M%=M%+1:IFM%=69M%=1
  680 IFM%(M%)<>1 ENDPROC
  690 S%(MX%(M%),MY%(M%))=0
  700 IFX%>MX%(M%) AND S%(MX%(M%)+1,MY%(
M%))=0 PROCOFF:MX%(M%)=MX%(M%)+1:PROCON
  710 IFX%<MX%(M%) AND S%(MX%(M%)-1,MY%(
M%))=0 PROCOFF:MX%(M%)=MX%(M%)-1:PROCON
  720 IFY%>MY%(M%) AND S%(MX%(M%),MY%(M%
)+1)=0 PROCOFF:MY%(M%)=MY%(M%)+1:PROCON
  730 IFY%<MY%(M%) AND S%(MX%(M%),MY%(M%
)-1)=0 PROCOFF:MY%(M%)=MY%(M%)-1:PROCON
  740 S%(MX%(M%),MY%(M%))=M%+1
  750 ENDPROC
  760 DEFPROCMD:M%((S%(FX%,FY%))-1)=0:MN
%=MN%-1:IFMN%=0 COLOUR1:PRINTTAB(0,24)"G
o to the gate!"
  770 ENDPROC
  780 ENDPROC
  790 DEFPROCOFF:PRINTTAB(MX%(M%),MY%(M%
))" ":ENDPROC
  800 DEFPROCON:VDU5:MOVEMX%(M%)*64,1023
-MY%(M%)*32:PRINTM$:VDU4:ENDPROC
  810 DEFPROCfi:FX%=X%:FY%=Y%:H%=0
  820 E%=E%-100
  830 IFD%=0GOTO850
  840 FD%=D%
  850 IFFD%=1 ORFD%=3 F$=CHR$233:ELSEF$=
CHR$234
  860 COLOUR1
  870 IFFD%=1 FY%=FY%-1
  880 IFFD%=2 FX%=FX%+1
  890 IFFD%=3 FY%=FY%+1
  900 IFFD%=4 FX%=FX%-1
  910 IFS%(FX%,FY%)=1 ENDPROC
  920 IFS%(FX%,FY%)>1 PROCMD:S%(FX%,FY%)
=0:SOUND1,1,50,2
  930 PRINTTAB(FX%,FY%)F$:SOUND2,-15,200
,0
  940 REPEAT:H%=H%+1:SOUND2,-15,200-(H%*
10),0
  950 IFFD%=1 FY%=FY%-1
  960 IFFD%=2 FX%=FX%+1
  970 IFFD%=3 FY%=FY%+1
  980 IFFD%=4 FX%=FX%-1
  990 IF S%(FX%,FY%)>1 PROCMD:S%(FX%,FY%
)=0:SOUND1,1,50,2
 1000 IF S%(FX%,FY%)=1 SPLAT=TRUE:GOTO10
20
 1010 PRINTTAB(FX%,FY%)F$
 1020 UNTILSPLAT
 1030 SPLAT=FALSE
 1040 REPEAT:H%=H%-1:SOUND2,-15,200-(H%*
10),0
 1050 IF FX%=DX% AND FY%=DY% ANDDEM%>0 D
EM%=DEM%-1:COLOUR3:PRINTTAB(DX%,DY%)CHR$
241:COLOUR1:IFDEM%=0 PROCdemdead
 1060 IFFD%=1 FY%=FY%+1
 1070 IFFD%=2 FX%=FX%-1
 1080 IFFD%=3 FY%=FY%-1
 1090 IFFD%=4 FX%=FX%+1
 1100 PRINTTAB(FX%,FY%)" "
 1110 UNTILFX%=X% AND FY%=Y%:PROCP(2):EN
DPROC
 1120 DEFPROCenergy
 1130 MOVE0,356:GCOL0,1:DRAWE%,356
 1140 IF E%<400 GCOL0,0:DRAW400,356:SOUN
D0,-8,6,1
 1150 GCOL0,2:DRAW1280,356:GCOL0,3
 1160 ENDPROC
 1170 DEFPROCerode
 1180 FORZ=1TO((LEV%-3)*5)
 1190 A=RND(16)+1:B=RND(16)+1
 1200 IFS%(A,B)<>1 GOTO1190
 1210 S%(A,B)=0:PRINTTAB(A,B)" "
 1220 NEXT
 1230 ENDPROC
 1240 DEFPROCdead
 1250 VDU4:COLOUR2:PRINTTAB(3,10)"YOU AR
E DEAD!"
 1260 Z=-15
 1270 FORA=255TO64STEP-8:Z=Z+.1:SOUND1,Z
,A,1:SOUND2,Z,A-32,1:SOUND3,Z,A-64,1:NEX
T
 1280 LI%=LI%-1
 1290 ENDPROC
 1300 DEFPROCdeath
 1310 Z=DED%
 1320 IFZ=1 DD%=8 ELSE IFZ=2 DD%=43 ELSE
DD%=26
 1330 S%(MX%(DD%),MY%(DD%))=0
 1340 PRINTTAB(MX%(DD%),MY%(DD%))" "
 1350 IFX%<MX%(DD%) AND S%(MX%(DD%)-1,MY
%(DD%))=0 MX%(DD%)=MX%(DD%)-1
 1360 IFX%>MX%(DD%) AND S%(MX%(DD%)+1,MY
%(DD%))=0 MX%(DD%)=MX%(DD%)+1
 1370 IFY%>MY%(DD%) AND S%(MX%(DD%),MY%(
DD%)+1)=0 MY%(DD%)=MY%(DD%)+1
 1380 IFY%<MY%(DD%) AND S%(MX%(DD%),MY%(
DD%)-1)=0 MY%(DD%)=MY%(DD%)-1
 1390 IFMX%(DD%)=X% ANDMY%(DD%)=Y% E%=E%
-100
 1400 COLOUR1:PRINTTAB(MX%(DD%),MY%(DD%)
)CHR$239
 1410 S%(MX%(DD%),MY%(DD%))=-1
 1420 ENDPROC
 1430 DEFPROCdem
 1440 S%(DX%,DY%)=0
 1450 PRINTTAB(DX%,DY%)" "
 1460 IFX%<DX% AND S%(DX%-1,DY%)<=0 OR X
%<DX% AND S%(DX%-1,DY%)>1 DX%=DX%-1
 1470 IFX%>DX% AND S%(DX%+1,DY%)=0 OR X%
>DX% AND S%(DX%+1,DY%)>1 DX%=DX%+1
 1480 IFY%>DY% AND S%(DX%,DY%+1)=0 OR Y%
>DY% AND S%(DX%,DY%+1)>1 DY%=DY%+1
 1490 IFY%<DY% AND S%(DX%,DY%-1)=0 OR Y%
<DY% ANDS%(DX%,DY%-1)>1 DY%=DY%-1
 1500 IFS%(DX%,DY%)>1 M%(S%(DX%,DY%)-1)=
0:MN%=MN%-1
 1510 IFDX%<11 AND DX%>8 AND DY%<11 AND
DY%>9 DEM%=0:ENDPROC
```

This is one of hundreds of programs now available FREE for downloading on

MicroLink

```
 1520 COLOUR3:PRINTTAB(DX%,DY%)CHR$240
 1530 S%(DX%,DY%)=-2
 1540 IF DX%=X% AND DY%=Y% E%=0
 1550 ENDPROC
 1560 DEFPROCdemdead
 1570 FORJ%=3TO0 STEP-1
 1580 SOUND0,-12,19+J%,5
 1590 COLOURJ%:PRINTTAB(DX%,DY%)CHR$240:
FORZ=1TO300:NEXT:PRINTTAB(DX%,DY%)CHR$24
1:FORZ=1TO300:NEXT
 1600 NEXT
 1610 S%(DX%,DY%)=0
 1620 ENDPROC
 1630 DEFPROCstomp
 1640 z%=RND(18):y%=RND(18)
 1650 IFS%(z%,y%)<>1ENDPROC
 1660 IFz%>8 AND z%<11 AND y%>8 AND y%<1
1 ENDPROC
 1670 COLOUR2
 1680 FORt%=1TO4
 1690 PRINTTAB(z%,y%);CHR$242
 1700 SOUND0,-15,4,1
 1710 PRINTTAB(z%,y%);CHR$243
 1720 SOUND0,-15,5,1
 1730 NEXT
 1740 S%(z%,y%)=0
 1750 PRINTTAB(z%,y%);" ";
 1760 ENDPROC
 1770 DEFPROCwipesome
 1780 FORw=1TO3-LEV%
 1790 FORt=1TO20
 1800 m=RND(68)
 1810 IFS%(MX%(m),MY%(m))<>0 MN%=MN%-1:S
%(MX%(m),MY%(m))=0:M%(m)=0
 1820 PRINTTAB(MX%(m),MY%(m));" ";
 1830 NEXT,
 1840 ENDPROC
 1850 DEFPROCp(b$,y%,Tp%,Mp%,Bp%,Tx%,Mx%
,Bx%,ly%,s%)
 1860 FORa=1TOLEN(b$)
 1870 MOVETx%,y%
 1880 z=ASC(MID$(b$,a,1))-64
 1890 IFz=-32 z=0
 1900 FORb=1TO LENl$(z)
 1910 s$=MID$(l$(z),b,1)
 1920 IFs$="1":DRAWTx%,y%
 1930 IFs$="2":DRAWMx%,y%-ly%
 1940 IFs$="3":DRAWBx%,y%-(ly%*2)
 1950 IFs$="4":DRAWTx%+Tp%,y%
 1960 IFs$="5":DRAWMx%+Mp%,y%-ly%
 1970 IFs$="6":DRAWBx%+Bp%,y%-(ly%*2)
 1980 IFs$="7":DRAWTx%+(2*Tp%),y%
 1990 IFs$="8":DRAWMx%+(2*Mp%),y%-ly%
 2000 IFs$="9":DRAWBx%+(2*Bp%),y%-(ly%*2
)
 2010 NEXT:Tx%=Tx%+(Tp%*2)+s%:Mx%=Mx%+(M
p%*2)+s%:Bx%=Bx%+(Bp%*2)+s%:NEXT
 2020 ENDPROC
 2030 DATA328971,4828631,7139,36841,3932
5217,325217,713985,32879,74639,7463,3272
9,39,31579,3197,7931,32871,7931795,32595
871,712893,746,397,67,3597,9537,5657,739
 2040 DEFPROCinst
 2050 PROCp("BY D HOPKINS",150,8,8,8,670
,670,670,12,16)
 2060 PROCp("GUIDE YOUR ANGEL",110,8,8,8
,600,600,600,8,16)
 2070 PROCp("ROUND THE THIRTEEN",80,8,8,
8,600,600,600,8,16)
 2080 PROCp("LAYERS OF HELL AND",54,8,8,
8,600,600,600,8,16):PROCp("PURIFY ALL SP
IRITS",24,8,8,8,600,600,600,8,16)
 2090 VDU5:MOVE0,200:PRINTM$:PROCp("SPIR
IT",196,8,8,8,100,100,100,8,16):MOVE300,
200:GCOL0,1:VDU239:GCOL0,2:PROCp("DEATH"
,196,8,8,8,400,400,400,8,16):MOVE600,200
:GCOL0,3:VDU240:GCOL0,2:PROCp("DEMON",19
6,8,8,8,700,700,700,8,16)
 2100 MOVE900,200:VDU242:PROCp("STOMPER"
,196,8,8,8,1000,1000,1000,8,16)
 2110 VDU4
 2120 FORv=1TO0STEP-1
 2130 GCOL0,v
 2140 PROCp("YOU ARE ENTERING THE GATE",
850,16,16,16,50,50,50,16,16)
 2150 PROCp("PREPARE YOURSELF",650,16,16
,16,270,270,270,16,16)
 2160 PROCp("FOR ADVENTURE",450,16,16,16
,320,320,320,16,16)
 2170 IFv=1 FORp=1TO1000:NEXT
 2180 NEXT
 2190 ENDPROC
 2200 DEFPROCfade:PROCW:VDU19,2,0;0;:PRO
CW:VDU19,3,0;0;:PROCW:VDU19,1,0;0;:ENDPR
OC
 2210 DEFPROCraise:PROCW:VDU19,1,4;0;:PR
OCW:VDU19,3,1;0;:PROCW:VDU19,2,2;0;:ENDP
ROC
 2220 DEFPROCW:FORp=1TO700:NEXT:ENDPROC
 2230 DEFPROCinit
 2240 a$="":x%=0:y%=0:lx%=0:ly%=0:s%=0:R
ESTORE2030:FORa=1TO26:READl$(a):NEXT
 2250 LI%=5:E%=1280:SPLAT=FALSE:ENVELOPE
1,4,-1,-3,-9,8,4,1,127,127,-3,-3,126,126
 2260 VDU23,235,7,24,39,74,74,191,170,17
0,23,236,192,48,200,164,164,250,170,170,
23,237,255,170,170,254,170,170,170,255,2
3,238,254,170,170,254,170,170,170,254,23
,244,0,0,18,0,0,0,0,0,23,245,62,73,73,73
,62,20,20,8,23,239,0,60,90,90,126,36,60,
0

 2270 M$=CHR$18+CHR$0+CHR$1+CHR$245+CHR$
8+CHR$18+CHR$0+CHR$2+CHR$244:G$=CHR$17+C
HR$2+CHR$235+CHR$236+CHR$10+CHR$8+CHR$8+
```

Get it right!

Turn to Page 126 ►

```
  10 =    0 0
  20 =    0 0
  30 =    0 0
  40 = E7D3 3
  50 = A69F 6
  60 = AB49 B
  70 = 8CF6 B
  80 = 6CF8 5
  90 = FECA C
 100 = DEBB C
 110 = 3203 5
 120 = 4A5F D
 130 = B962 E
 140 = 78AB 8
 150 = 41D9 B
 160 = 3182 C
 170 = 1407 5
 180 = C31F 9
 190 = 5B2C 1
 200 = 27E2 2
 210 = 77C6 D
 220 = 8D7A 6
 230 = 19F3 4
 240 = 10DD 5
 250 = A958 8
 260 = 3155 5
 270 = 4EFC F
 280 =  433 A
 290 = 20FF 1
 300 = D370 F
 310 =  86C 8
 320 = BFBA 5
 330 = F453 1
 340 = 703C 9
 350 = 5B06 3
 360 = BBF9 2
 370 = 5E5E 7
 380 = B506 7
 390 =  E61 B
 400 = BE32 1
 410 = 8839 F
 420 = 6DAE 5
 430 = D937 E
 440 = 9CAA F
 450 = ABEA B
 460 = 8E64 5
 470 = 30F8 E
 480 = A8CD A
 490 = FB2B 0
 500 = C5E0 9
 510 = 4A7A 6
 520 = A172 7
 530 = 93F1 3
 540 = 2139 9
 550 = A022 6
 560 = 8532 9
 570 = 4437 8
 580 = 2C83 F
 590 = 38B4 F
 600 = 1367 6
 610 = F4BC C
 620 = 7A84 9
 630 = 7A64 A
 640 = E8B0 B
 650 = 9766 E
 660 = ED0F 1
 670 = 4415 A
 680 = D124 7
 690 = 6976 9
 700 = EA06 6
 710 = 931D 8
 720 = 41D5 4
 730 = B8E1 4
 740 = 4DAE C
 750 = ED0F 2
 760 =  E2D D
 770 = ED0F 7
 780 = ED0F C
 790 = D88E 9
 800 = DA90 F
 810 = AFCE 5
 820 = 652D 7
 830 = F2C0 F
 840 = C6AF 3
 850 = 3C3C 7
 860 = E949 2
 870 = 3F0B 1
 880 = DC30 1
 890 = 351E 4
 900 = 8762 A
 910 = F156 5
 920 =  D0C B
 930 = E2B1 C
 940 = E064 7
 950 = 3F0B 2
 960 = DC30 C
 970 = 351E B
 980 = 8762 D
 990 = 6DF7 C
1000 = 9BB3 C
1010 = 87AA F
1020 = 1D64 A
1030 = B4A4 D
1040 = AE7F 5
1050 = 45C0 C
1060 = 95AD 8
1070 = 7696 1
1080 = 9FB8 6
1090 = 2DC4 C
1100 = C420 0
1110 = D154 B
1120 = CB6B B
1130 = EFC3 8
1140 = 3697 E
1150 = 334B 7
1160 = ED0F C
1170 = 68B9 2
1180 = D01D C
1190 = AFED F
1200 = DCE1 7
1210 = 4F36 8
1220 = 2C83 8
1230 = ED0F E
1240 = 66A3 4
1250 = C504 5
1260 = D236 2
1270 = E018 9
1280 =  FD8 6
1290 = ED0F 5
1300 = 41BD 8
1310 = 3CFD 7
1320 = 7E93 9
1330 = 96B3 0
1340 = DDFF 9
1350 = FBFD 4
1360 =  60D 2
1370 = 94C9 1
1380 = 9C1D 2
1390 = 5076 3
1400 = A7E5 2
1410 =  322 7
1420 = ED0F 7
1430 = 6AC2 9
1440 = 19B1 C
1450 =  470 3
1460 = B7F0 F
1470 = 7F7A B
1480 = 3599 4
1490 = 59A7 6
1500 = 9F4F A
1510 = 53BE 2
1520 = B818 F
1530 = 5126 A
1540 = 134F A
1550 = ED0F B
1560 = 8E6F 4
1570 = B1DE 4
1580 = 33B8 5
1590 = 67F8 2
1600 = 2C83 F
1610 = 19B1 2
1620 = ED0F D
1630 = 7EF3 D
1640 = D2BE E
1650 = 942B 8
1660 = AE1C 2
1670 = D92A 3
1680 = AE36 E
1690 = A96F 0
1700 = F4D9 2
1710 = B94E 2
1720 = C3E9 5
1730 = 2C83 1
1740 = 779A 8
1750 = AEE1 F
1760 = ED0F D
1770 = E7DE C
1780 = D9EC F
1790 = F66F F
1800 =  4CC D
1810 = C25F 6
1820 = 2597 E
1830 = 8300 7
1840 = ED0F 7
1850 = D882 F
1860 = B0A7 5
1870 = 9DBC 7
1880 = E7F6 9
1890 = A7C2 A
1900 = 180E 0
1910 = 334E 5
1920 = 601F 3
1930 = 2C7F 5
1940 = 201F 5
1950 = 5A84 3
1960 = CB9A C
1970 = F9FA 2
1980 = 2C4D 5
1990 = 9295 D
2000 = C301 B
2010 = B51B 7
2020 = ED0F F
2030 = 8887 B
2040 = D8F4 F
2050 = 5A3F A
2060 = EAF0 8
2070 =  7BA 2
2080 = 6CA2 2
2090 =  2E5 1
2100 = 2D4E 0
2110 = 765B E
2120 = 4776 4
2130 = 3B0C C
2140 = F02D 0
2150 = 21F7 A
2160 = D682 B
2170 = E06C 4
2180 = 2C83 5
2190 = ED0F D
2200 = 4826 C
2210 =  31B 3
2220 = A3E0 0
2230 = 344C F
2240 = 799A 2
2250 = FB49 3
2260 = 719F 9
2270 = 2AF1 C
2280 = ABA8 D
2290 = E26B 2
2300 = D65C 7
2310 = 764C 0
2320 = ED0F 2
2330 =  7F8 6
2340 = 5E5E 0
2350 = 3725 E
2360 = 617A 9
2370 = 71EB D
2380 = 290B 5
2390 = FD53 1
2400 = 2C83 A
2410 =  32F 2
2420 = 25C5 5
2430 =  2BC A
2440 = 3F39 C
2450 = 3408 E
2460 = ED0F C
2470 =  675 C
2480 = D785 F
2490 = ABCC E
2500 = 2C83 E
2510 = A3B8 C
2520 = 47FF F
2530 = F423 4
2540 = 2C83 C
2550 =  464 0
2560 = 4B99 C
2570 = 471E 3
2580 = 3FFA B
2590 = 48F9 7
2600 = F49D 2
2610 = 829C D
2620 = 4452 9
2630 = 88C9 9
2640 = F2C1 B
2650 = 61E3 9
2660 = 5DEC 8
2670 = FD2E A
2680 = 495C 8
2690 =  32F B
2700 = 4200 E
2710 = 236D F
2720 = 3D6D 0
2730 = EE1E A
2740 = D369 A
2750 =  216 1
2760 = 73FB 4
2770 = 12A2 9
2780 = BC1B 6
2790 = ED0F C
2800 = 2274 A
```

◄ From Page 125

```
CHR$237+CHR$238
 2280 VDU23,224,28,42,28,0,62,73,20,20,2
3,225,12,30,12,2,28,2,2,6,23,226,12,30,1
2,2,28,0,20,18,23,227,28,42,28,34,73,20,
20,16,23,228,28,42,28,34,73,20,20,4,23,2
29,28,62,28,34,73,20,20,4,23,230,28,62,2
8,34,73,20,20,16
 2290 VDU23,240,66,66,102,90,60,36,60,24
,23,241,66,66,102,90,126,36,36,24,23,242
,0,4,36,32,6,103,231,224,23,243,0,32,36,
4,96,230,231,7,23,231,12,30,12,16,14,16,
16,24,23,232,48,120,48,64,56,0,40,72,23,
233,24,24,24,24,24,24,24,24
 2300 VDU23,234,0,0,0,255,255,0,0,0,23,2
55,0,251,251,251,0,191,191,191,23,253,25
5,255,255,255,255,255,255,255
 2310 M$(0,0)=CHR$224:M$(0,1)=CHR$224:M$
(1,0)=CHR$229:M$(1,1)=CHR$230:M$(2,0)=CH
R$231:M$(2,1)=CHR$232:M$(3,0)=CHR$227:M$
(3,1)=CHR$228:M$(4,0)=CHR$225:M$(4,1)=CH
R$226
 2320 ENDPROC
 2330 DEFPROCBOLT(X%,Y%,MX%,MY%)
 2340 T%=T%+1
 2350 A=MX%-X%:B=MY%-Y%:A=A/50:B=B/50
 2360 LX=MX%:LY=MY%
 2370 FORZ%=1TO100STEP2
 2380 LX=LX-A:LY=LY-B
 2390 GCOL0,0:MOVELX+(20*A),LY+(20*B):DR
AWLX+(10*A),LY+(10*B):GCOL0,3:DRAWLX,LY
 2400 NEXT
 2410 GCOL0,1
 2420 MOVELX+50,LY:MOVELX-50,LY:PLOT85,L
X+50,LY-100:GCOL0,2:PLOT85,LX-50,LY-100
 2430 PROCletter(LX-32,LY-32):ENDPROC
 2440 DEFPROCletter(K%,k%)
 2450 MOVEK%,k%:GCOL0,0:VDU5,253,8:GCOL0
,3:PRINTMID$(A$,T%,1):VDU4
 2460 ENDPROC
 2470 DEFPROCboltinit
 2480 T%=0:A$="USER":FORT=1TO4
 2490 PROCBOLT(200+(T*150),100,856,776)
 2500 NEXT
 2510 GCOL0,0:MOVE1280,100:MOVE0,100:PLO
T85,1280,400:PLOT85,0,400
 2520 T%=0:A$="MICRO":FORT=1TO5
 2530 PROCBOLT(100+(T*150),300,856,776)
 2540 NEXT
 2550 GCOL0,0:MOVE1280,300:MOVE0,300:PLO
T85,1280,600:PLOT85,0,600
 2560 T%=0:A$="THE":FORT=1TO3
 2570 PROCBOLT(250+(T*150),500,856,776)
 2580 NEXT:GCOL0,0:MOVE1280,500:MOVE0,50
0:PLOT85,1280,800:PLOT85,0,800
 2590 FORT=1TO16:PRINTTAB(0,31)"":NEXT
 2600 PRINTTAB(5,18)"PRESENTS"
 2610 FORp%=3TO1STEP-2:GCOL0,p%:PROCp("T
HE GATE",350-(p%*2),20,24,28,364+(p%*2),
324+(p%*2),284+(p%*2),64,16):NEXT
 2620 VDU5:GCOL0,2:MOVE900,300:PRINTG$:V
DU4
 2630 PRINTTAB(4,29)"PRESS A KEY":A=GET:
CLS:ENDPROC
 2640 DEFPROCwipemem:*FX15
 2650 COLOUR0:*K.0 DEL.60,90|MDEL.2330,2
670|MRUN|M
 2660 *FX138,0,128
 2670 END
 2680 DEFPROCwin:VDU28,0,19,19,0:CLS
 2690 GCOL0,1
 2700 PROCp("YOU HAVE DONE WELL",1000,20
,20,20,100,100,100,40,16)
 2710 GCOL0,3
 2720 PROCp("THE ANGELS WELCOME",800,20,
20,20,100,100,100,24,16)
 2730 PROCp("YOU TO THEIR",725,20,20,20,
200,200,200,24,16)
 2740 PROCp("BROTHERHOOD",650,20,20,20,2
25,225,225,24,16)
 2750 PROCW:PROCW
 2760 PROCp("IMMORTALITY",575,20,20,20,2
25,225,225,24,16)
 2770 PROCp("IS YOUR REWARD",500,20,20,2
0,175,175,175,24,16)
 2780 A=GET
 2790 ENDPROC
 2800 MODE7:REPORT:PRINT" at line ";ERL:
END
```

FREE

with every computer we sell . . .

. . . our expertise!

If you are buying a new Archimedes or Master Series computer, you don't expect to know all about it from day one. That's where we come in. We don't leave our customers high and dry with their problems – they know they can rely on us to get them out of trouble. Whether it's hardware or software, we're the people who know.

Acorn R140 Unix Workstation

Cambridge Z88 Portable

THE DATA STORE

6 Chatterton Road, Bromley, Kent
Tel: 01-460 8991. Fax 01-313 0400
(closed Wednesday)
An old-fashioned specialist computer shop

MAKE YOUR MICRO EARN!

Yes making money with your micro becomes incidental when you know how. Your micro is, if only you knew it, a gold mine. The size and make is irrelevant. Make the initial effort. **NOW** by starting your own **HOME BASED BUSINESS.**

This may be the most important move you will ever make!

REMEMBER: You'll never get rich by digging someone else's "ditch". Anyone in the country, including **YOU**, can become very rich in a relatively short period of time just by doing a few basic things! It's more rewarding than playing games. The benefits are many and varied. Full or part time. For **FREE** details send S.A.E. to:

HOME BASED BUSINESS
31 PILTON PLACE (MU7)
KING AND QUEEN STREET
WALWORTH, LONDON SE17 1DR

Field Electric Ltd Tel: 01-953 6009 Fax: 01-207 6375

3 Shenley Road, Borehamwood,
Herts. WD6 1AA. 0836 630328

Special Offer. NEC 9" Green Screen Monitors. 75Ω composite video input. Plastic case with built in handle. 240 vac input. Tested. **£25.50 c/p £5.50.**

Motorola TTL Monitor Chassis.7" green phosphor 22Mhz bandwidth. **12 VDC** input **1.2A.** New & boxed with circuit dia: Compatible to BBC/IBM computers 75Ω composite video dia=**AVA= £25.00 c/p £4.00.**

5.25" Winchester (half height) Hard Disk Drive. New unformatted storage capacity 12.8 MB.+5VDC .8A +12VDC 1.5A. TM 252 by Tandon. **£79.00 c/p £3.00**

Astec Switch Mode PSU new & boxed. +5V 5.0A +12V 2.0A -12v .2A **£21.95 c/p £1.80.** Data supplied.

Hard Drive Data Cables	**£2.00 c/p 60p**
RS-232C Gender Changer female/female	**£10.95 c/p 60p**
AT Serial Lead 25D to 9D	**£14.95 c/p 60p**
BBC Printer Lead	**£9.50 c/p 60p**

We stock switch mode/linear PSU etc.

You ain't seen nothing yet.

PipeDream 3 - 100% RISCware

Available July 1989

See it on stand 37 at the Acorn User Show July 21-23

COLTON SOFTWARE, BROADWAY HOUSE, 149-151 ST. NEOTS ROAD, HARDWICK,
CAMBRIDGE CB3 7QJ, ENGLAND. TEL. 0954 211472 FAX. 0954 211607

STAR DEVICES

THE CONCEPT KEYBOARD SOFTWARE HOUSE

have moved to

OLD SOLENT HOUSE
111/117, FOUNDRY LANE
SHIRLEY
SOUTHAMPTON
SO1 3GB
Tel: 0703 701694

We are always interested in hearing about your projects using the Star Microterminals Limited Concept Keyboard and will consider publishing software on your behalf.

Please write to DAVID JUPP at the above address.

Mijas Software
Bringing the new software world to YOUR BBC Micro

New Issue of
'A Book on C'
by Berry and Meekings
£11 inclusive

All software available for Archimedes as well as BBC B and Master series

Assembler, Linker, Debug, Shell and Small 'C'
New Optimiser also available (see below) £50 +VAT

Professional-style assembler, modular, relocatable, disk to disk.
Full Specification Linker giving compact run-files anywhere in memory.
Source-Level Debug for rapid and effective testing of 'C' or assembler.
Full Library facilities, 'C' and assembler Libraries provided (with sources).
★Extended implementation of the original Small C including BBC graphics.
Full Source Code provided for the 'C' compiler, add your own features!
Many times faster than BASIC, 40K+ Program space in stand-alone mode.
Post-sales support, low cost updates.
★ Original Small 'C' code supplied with the development system at the cost of distribution

New Code Optimiser
Revolutionary new Code Optimiser for Small C. Your programs use LESS memory and run up to THREE TIMES faster than before. Forget about assembler code and use Mijas Small C for high-speed graphics, text and word processors and many other programs. This new optimiser does not change your programs, has no restrictions, and makes them run up to 24 times faster than BBC BASIC. Upgrade from Small C (any issue) £25+vat. Complete system with Small C and optimiser £70+vat.

Other Microprocessors
Development system for the Mitubishi 740 series as well as for the 6502 and 65C12. Supports all the new addressing modes. Mix C and Assembler. Write software for single board computers and other industrial applications using your BBC computer. Price including optimiser £150+VAT.

All software available in DFS or ADFS format on 5.25 or 3.5in. Discs.

Laser Typesetting Program
Professional printing you can afford today. Our new LASER TYPESETTING PROGRAM prints multi-window multi-column, multi-page Text & Graphics. Software £25+VAT.Requires one of the new low-cost Laser or desk-jet printers with proportional fonts. Witten in Small C. Will run on Archimedes or BBC B or Master series computer. Full C Source provided.

Now at last you can achieve the speed of a true compiler without loosing the program size advantages of BASIC.

Use it for games business or industrial software. Ideal for learning structured programming and compiler techniques.

VISA

Educational and departmental orders welcome. Please write for quantity and networking discounts. Full support on all software.

Mijas Software, Winchester Rd. Micheldever
Winchester Hants SO21 3DG
Telephone 0962-89-352 (24 Hr. Answering service)

INTRODUCING THE FIRST MULTI-LAYER BACKPLANE FOR ARCHIMEDES 305/310

The 4-slot backplanes currently available for the Archimedes 305 and 310 are all intended to do an identical job. They may even look very similar, ***but the fact is they are not the same.***

Whereas cheaper backplanes use a simple double-sided circuit board, ours is a true multi-layer design. This is particularly effective in reducing electrical noise. Our backplane has already been shown to work in situations where a double-sided version did not.

Fitting the backplane is a simple operation that requires no soldering.

Features;

- ★ **Multi-layer design**
- ★ **Accepts up to 4 podules**
- ★ **Co-processor option**
- ★ **12 month warranty**
- ★ **Easy to install**
- ★ **Money-back guarantee**
- ★ **Approved by Computer Concepts**

Having compared several 4-slot backplanes from different sources, Computer Concepts have given approval to ours because of its superior performance. The A440 is fitted with a multi-layer backplane as standard. Since these boards are more expensive to manufacture, it is fair to assume that it has been considered necessary for technical reasons.

28-day money-back guarantee

Prices (including VAT)

4 slot backplane	£59.95
Co-processor version	£62.95
2 slot backplane	£19.95
Fan/filter for above	£10.00
Comp. Concepts ROM board	£54.00
As above with battery back-up	£64.00
Acorn 20Mb hard disc	£515.00
New RISC OS ('phone first)	£35.00

Postage is £1.00

SPECIAL OFFERS

4-slot backplane and Comp. Concepts ROM board...£109.95 (add £9 for battery back-up and £10 for fan/filter)
Used 2-slot backplane with new fan...£24.95
(NB subject to availability)

Dealer enquiries welcome

ORDERING DETAILS

Order with Access
☎
(0752) 847286

Prices include VAT, but please allow £1 postage (UK/BFPO). Access orders accepted on (0752) 847286, and official orders welcome.

IFEL
36 Upland Drive
Derriford
Plymouth PL6 6BD
(0752) 847286

AMPSOUND
153a Victoria Street, St. Albans

As pro-audio dealers, we specialise in sound-related products for one of the fastest computers available today – the Archimedes. Its capabilities are endless and we can prove it to you. We even use the system for our own business affairs!

For best Archimedes Prices Please Ring.

So, if you need any advice or information on this, or any other Acorn product call us now. Free bumper catalogue and price list available. Major software/hardware from Clares, Minerva, Computer Concepts etc.

Armadillo
8 bit sound sampler....................... Mono £130.00
Stereo £160.00
Stereo + Midi £190.00
16 bit sound sampler
orders taken now! Pre-launch price £950.00

EMR
Studio 24 + sequencer £99.00
Midi interface (4 in, 4 out) £129.00
Please enquire for other products.

Prices exclude VAT
Payment by Cheque or Access accepted
0727 50075

Computaccount (UK) Ltd
11 High Street, Harborne
Birmingham B17 9NT
Tel: 021 428 1111

We are major suppliers to the educational and health sectors

Please telephone for our free extensive catalogue and price list. Hundreds of products listed at excellent prices.

Archimedes

THE NEW RISC COMPUTER FROM ACORN. A VERY FAST 32 BIT MACHINE, SPECIFICALLY AIMED AT THE EDUCATION MARKET COMPATIBLE WITH MOST EXISTING BBC SOFTWARE

	Base model	+ Mono monitor	+ Colour monitor
Archimedes 305 *512k RAM, 512K ROM, 1Mbyte 3.5" drive*	£699	£749	£859
Archimedes 310 – *As 305 but 1024k RAM*	£835	£895	£995
Archimedes 440 – *As 310 but 4048k RAM* *20Mbyte hard disc & Floating point option*	£2399	£2479	£2629

NEW MODELS	Base Model
Archimedes 410/1	£1199
Archimedes 420/1	£1699
Archimedes A3000	£649

ARCHIMEDES UPGRADES

Archimedes Reference Manual	£29.95
Archimedes Podule Back Plane	£39.00
Archimedes ROM Podule	£56.00
Archimedes I/O Podule	£78.95
Archimedes Midi I/O Add-on	£39.00
Archimedes Midi Podule	£69.00
Archimedes Econet Podule	£43.00
Archimedes PC Emulator	£95.00
Archimedes Floppy Drive Unit	£125.00
Archimedes 20Mb Hard Disk	£469.00

ACORN

Master 128	£399.00
Compact entry system	£345.00
Compact TV system	£355.00
Compact with mono monitor	£379.00
Compact with colour monitor	£525.00

BBC/MASTER ACCESSORIES

RS 232 interface for compact	£26.00
Extra 3.5in drive for compact	£99.00
PAL TV adaptor for compact	£26.00
Master Econet module	£43.47
Turbo upgrade	£108.00
64K upgrade kit for B+	£34.74
File Store E01	£799.00
File Store E02 (20mb)	£595.00
Master ROM/RAM cartridges	£11.95
Acorn DNFS kit	£84.00
1770 upgrade kit	£49.00
ADFS ROM	£26.04
CONCEPT Keyboard	£124.95
View manual	£10.00
Viewsheet manual	£10.00
Master Reference Guide	£14.95

DISC DRIVES

Mitsubishi 400k DS 40/80 track	£99.00
Mitsubishi dual 400k DS 40/80 with PSU	£216.00
Opus DDOS kit	£59.95
Pace PSD3P 400k 40/80T with PSU	£144.00
Pace PDD3P dual 400k 40/80T with PSU	£260.00
Akhter MD802E dual 400k DS 40/80T mounted in monitor stand	£285.00
Cumana CS400S 400k DS 40/80T with PSU	£152.00
Cumana CD800S dual 400k SS 40T with PSU	£295.00
Cumana CS354 SS 3.5" with PSU	£121.70
Cumana CD358 DS 3.5" with PSU	£210.00
Cumana CCD2000S 3.5" + 5.25" with PSU	£282.17

ARCHIMEDES SOFTWARE

System Delta Plus Database	£69.95
System Gamma Plus Graphics	£69.95
System Delta Account (per module)	£64.95
School Administrator	£79.95
Video Rental	£69.95
Newsagent	£69.95
Clares AlphaBase	£49.95
Clares Image Writer	£29.95
Archimedes Tool Kit Module	£39.95
Ansi C	£99.00
ISO Pascal	£99.00
Assembler	£199.00
Logistix	£99.00
Kermit	£49.00
Twin	£29.00
Zarch	£17.35
Conqueror	£19.95

MONITORS

Mono	
Philips green Hi-res 7502	£85.00
Colour	
Microvitec std-res 1431	£191.00
Microvitec med-res 1451	£229.00
Microvitec hi-res 1441	£399.00
Philips 8833 RGB Med-res + composite video	£251.00
Monitor cables (state type required)	from £3.50
Master Monitor bridge single height	£25.00
double height	£28.00

PC'S

AMSTRAD	
PC2086 HD Mono	£995.00
PC2086 HD Hi-res Colour	£1295.00
PC2086 DD Mono	£745.00
PC2086 DD Hi-res Colour	£1095.00
PPC 640	£479.00
PPC 640 D	£599.00
PCW 8256	£299.00
PCW 8512	£449.00
PCW 9512	£499.00
OPUS	
PC3 HD Mono	£995.00
PC4 HD EGA	£995.00
PC5 HD Mono	£1349.00
MICROVITEC	
PC 4	£965.00
PC 5	£1395.00

SOFTWARE:
Call for full list of IBM Compatible and Amstrad software

AMX

Please state whether for BBC or Master

AMX mouse with Super Art ROM	£78.00
Stop Press	£43.43
Paintpot	£13.00
Desk	£21.70
Super Art ROM	£43.43
Database	£21.70
Utilities	£13.00

PRINTERS

DOT MATRIX

Amstrad DMP 3250	£189.00
Amstrad DMP 4000	£349.00
Amstrad LQ 3500 24 pin	£345.00
Amstrad LQ 5000 24 pin 288cps	£440.00
Citizen 120D	£149.00
Citizen 180E	£225.00
Citizen MSP 15E	£299.00
Citizen MSP 40	£385.00
Citizen MSP 45	£485.00
Citizen MSP 50	£485.00
Citizen MSP 55	£649.00
Citizen HQP 40	£459.00
Citizen HQP 45	£559.00
Citizen Col. Kit for MSP 50/55 + HQP 40	£60.00
Epson LX800 150cps 80col NLQ	£205.00
Epson LQ500 24pin + paper park	£327.00
Epson FX850	£345.00
Epson FX1050	£440.00
Epson EX800 (optional colour)	£457.88
Epson EX1000 (optional colour)	£614.63
Epson LQ 850 180cps 24 pin matrix NLQ	£479.00
Epson LQ 1050 180cps 24 pin 132 col NLQ	£659.00
Star NX 15 NLQ 132 col 120cps	£349.00
Star SD15 NLQ 132col 160cps	£415.65
Star NB24 15 NLQ 24 pin 216cps	£683.00
Star NB15 NLQ 24pin 300cps	£764.00
Star ND 15 180cps	£440.00
Star NR15 240cps 136col	£529.00
Star LC10 Mono	£220.00
Star LC10 Colour	£259.00
Star NB24-10	£349.00
Brother 1109 Par + Ser 100cps + NLQ	£211.50
Brother 1409 Par + Ser	£349.00
Brother 1509 Par + Ser 180cps + NLQ	£449.00
Brother 2024 Par/Ser NLQ 24pin 160cps	£750.00
Panasonic KX-P 1081	£279.00
Panasonic KX-P 1090	£233.00
Panasonic KX-P 1092	£315.00
Panasonic KX-P 1592	£405.00
Micro-P MP165 NLQ	£208.70
Micro-P MP200 "NEW"	£299.00
Parallel printer cable BBC	£9.00
Parallel printer cable IBM etc from	£15.00

DAISY WHEELS

Brother HR20	£399.00
Brother HR40	£995.00
Juki 6200	£454.00
Juki 6300	£694.00
Citizen Premier 35	£599.00
Panasonic KXP3131	£299.00

LASER

Epson GQ3500	£1450.00
Citizen Overture	£1390.00
Brother HL-8 Mutli Emulation	£1895.00
Star LP-8 Lazer Printer inc maint	£1995.00

BBC ROM SOFTWARE

Computer Concepts	
Wordwise Plus	£40.00
Printmaster	£25.00
Accelerator	£48.00
Speech ROM	£27.50
Spellmaster	£46.00
InterWord	£48.00
Intersheet	£48.00
Interchart	£28.50
Interbase	£59.00
Acorn	
View 3.0	£63.00
ViewPlot (Disc)	£25.75
ViewSpell	£33.50
Viewsheet	£45.00
Viewstore	£45.00
GXR (please state whether for B or B+)	£23.00
ISO Pascal	£52.00
LISP	£39.00
BCPL	£46.00
Logo	£52.00
ADFS	£26.04

ACCESSORIES

Epson FX 100/105 Sheet Feeder	£139.00
Brother HR sheet feeder	£209.00
Epson MX/RX/FX 80 Ribbons	£2.95
Epson MX/RX/FX 100 Ribbons	£4.50
Canon PW 1080/1156 Ribbons	£5.00
Taxan Kaga KP810 Ribbons	£5.00
Citizen printer ribbons	from £3.65
All Epson Spares available	£POA
Listing Paper (Box 2000)	from £13.10
Disks 5.25" DS/40/80 Box of 10 inc Library Case	£15.00
Lockable Disk Storage Box	£9.50
Printer Stands 80 Col	£19.95

Massive range of other compatible ribbons available

SPECIALS

Printer Stands 80 Col £9.95
Disc Jockey (a holder for discs pens & labels etc) £0.79p

BOOKS

BBC
MASTER
ARM
ARCHIMEDES
MS DOS
VIEW
WORDWISE ETC. . .

SPECIAL SOFTWARE

Torch Turbo Library £45.00
functions and procedures for Turbo Pascal to access the power of Torch/BBC facilities

dBase special £45.00
dBase helper program now available for those who want to access the powerful facilities in dBase, without having to learn how to program in dBase

Personalised Gift Vouchers Now available

HOW TO ORDER

Payment by cheque to:
COMPUTACCOUNT (UK) LTD

Carriage: Items less than £50: £2.50, £50-£100: £4.50
Carriage and insurance on items more than £100: £9.50

Please add VAT at 15% to Total, including Carriage

NAME ....
ADDRESS ....
.... Tel: ....

Quantity	Item	Price	
....		£	£ ....
....		£	£ ....
....		£	£ ....
		Total £	....

Send to Computaccount (UK) Ltd., 11 High Street, Harborne, Birmingham B17 9NT
or Telephone 021-428 1111 with your Access details
(No cash by post please)

***FAMILY HISTORY SYSTEM**
TOTALLY new Archimedes version available June £25.64

****PAYROLL (Wages)**

**** ACCOUNT PLUS**

New **** TAXMAN**
End of Year Balance Sheet

Micro Trader £230, Micro Stock £86.25 plus other programs
(Prices: * £20.64) | (* * £58.13 inc VAT)

see us at the BBC ACORN USER show '89

Micro Aid
Kildonan Courtyard, Barrhill, S. Ayrshire, KA26 0PS
Telephone: 0465-82288 and speak to Colin

Archimedes

512 users

Solve your compatibility problems using **DOS+ Problem Solver**

It enables the 512 board to run most IBM-PC programs that otherwise wouldn't run, emulates the missing keys that BBC model B users don't have and allows the saving of high-res screens from any program.

PRICE: £24.95 (including program, user manual and 1 year free user support)
"What a great program Problem Solver turned out to be.
... if you have a program that you use at work on the office PC and you want to get it up and running on your model B or Master, it will seem worth it to you.
And if you want to play PC games, then you really will notice a difference."
BBC Acorn User , May 1989, pages 129-130 (editorial review)

Lots of programs like Cat, Jet, Digger, Artwork's Strip Poker, ELECTRONIC ART's Golf, Driller, Dark Side, Impact, Charlie Chaplin, Test Drive, Infiltrator, StarQuake, Bushido, Tennis, Frogger, all versions of MicroSoft's Flight Simulator, Orbit, 688 Attack Sub, Defender of the Crown, Quadralien, Yes Chancellor, Ancient Art of War, Adventure Writer, Dream House, AFT, Droege, Dream, Delux Paint 2, Fontasy 2.08, News, PC Tutor, Lotus 123 2.0, Turbo Calc, Mandelbrot Generator, Prospero Pascal, Turbo Pascal 4.0, Turbo C 1.5, Turbo Prolog, Prolog2, PC File+, Galaxy, Trendten/2, Homebase 2.15, Mindreader, DBASE III plus, Pipedream, and many more will run like on an ordinary IBM PC.

Available from Shibumi Soft, R. Prof. Camara Sinval 138, 4100 PORTO - PORTUGAL

Payment can be made with an ordinary English cheque. Please add £3 for postage and packing.
Faulty disks will be replaced.

ADVERTISERS' INDEX

4mation 78
Ampsound 128
Apricote Studios 130
B&S Computing 27
BBC Acorn User Show 79
Beebug 6,8,10
Cambridgeshire Software 98
Care Electronics 64
Circle Software 44
CJE Micros 12
Clares 68,102
Clarke Computer Services 78
Colton Software 127
Computer Concepts 54,82,83
Contex Computing 107
Computaccount 129
Database Educational Software 74
Dataplex 46
Datastore 126
Datech Associates 120
Derbyshire Software 114
Electro Music Research 107
Field Electric 126
Format PC 49
Home Based Business 126
IFEL 128
Impact 18,19,131
Integrex 73
Keyzone Computer Products 98
Labelwise 114
Mach Technology 2,16,17
Manor Court Supplies 60
M D Office Supplies 24
Meadow Computers 98
Mewsoft 130
Micro Aid 130
Microboss 114
Micromedia 107
Mid Sussex Software 130
Mijas Software 128
Minerva 36,56
Morley Electronics 59
Paul Fray 120
Pineapple Software 63
PMS 110
Selec Software 110
Shibumi Soft 130
Silicon Vision 15
Simtron 98
Star Devices 128
Superior Software 132
Swift Software 63
Technomatic 3
Techsoft 40
TK Computerware 64
Towerhill 76
Voltmace 30
Watford Electronics 84-97
Weserve 120
WL Computer Services 114

MUSIC PROGRAMS

- ★ PLAYBEEB £7.95 *Fun for 3-7 year olds*
- ★ RECOMPOSER
- ★ RHYTHM TUTOR
- ★ PITCH TRAINER

} £12.50 each. *Enjoyable and educational programs for a wide range of abilities*

- ★ MUSIC PROCESSOR £54.95 *High quality music printout plus much more!*

Available on 40 or 80 Track disc for BBC B or MASTER
Send for more details to:-

Mid-Sussex Software
11 BRIDLE WAY, POUND HILL, CRAWLEY, RH10 4HP.
TEL. (0293) 882130

MEWsoft Latest

Now you can create labels like this using the **FANCY LABELLER.** Comes with 6 Fancy Fonts and 12 Fancy Frames. Many Uses!

Still available:

The Fax*File Organiser: The essential utility for the owner of a personal organiser.
Extremely Friendly. I cannot fault it.-Beebug

THE A4 Forms Designer: Ideal for home, business and education. (Master or Model B with Shadow RAM)
A cheap and effective program.-Acorn User

All Programs £12.95 inc. manual, p.p. (no VAT)

**MEWsoft, 11 Cressy Road, London
NW3 2NB. Tel: 01 267 2642**

THIS IS THE BUSINESS

THE ACCOUNT BOOK
The easiest to use accounting system for the BBC/Acorn range. How do we know? Simple, dozens of letters from satisfied customers. Unlimited entries, automatic date order, dozens of reports, full vat facilities.
Just £27.95. (see review in Beebug Vol. 7, No. 5)

And now: THE INVOICE PROGRAM
700 customer database. Very neat invoices with huge description space (max. approx. 2000 words!), Unpaid or Paid - database or one-offs - on continuous/single paper (for use with your own letterheads if you want - any size). Part/paid invoices. Automatic statements. Credit notes. User specified messages, credit terms, overdue messages, 100 stock description labels. Full vat facilities. Instant customer credit details, full linking with The Account Book and much, much more.
Amazing value at £27.95. You will not be disappointed.

Both the above programs can be used independently or linked together.
Special offer price for both £49.95

Order by phone, coupon or send for the fact sheets.

Please tick:
☐ 5.25" disc ☐ 3.5" disc ☐ ADFS ☐ DFS
☐ 80 track (minimum 1 double sided drive)
☐ 40 track (minimum 2 single drives)
☐ Account Book £27.95 ☐ Invoice Program £27.95 ☐ Both £49.95
Name: ....
Address: ....
....
Post Code: .... Telephone: ....
Access Card No. ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ Signature ....
Please send order to Apricote Studios, 2 Purls Bridge Farm, Manea, Cambs, PE15 0ND or telephone 035 478 432 with your Access card number/enquiry.
All orders sent by return of post.

FREE 8 PAGE CATALOGUE

Send a stamped addressed envelope for your copy

FREE HELPSHEETS/MAPS

Spend over £4 on games and you may choose **ONE** of the following helpsheets/solutions and maps absolutely **FREE**.
Spend over £10 and you may choose any **TWO FREE** :-

Pipeline	(Helpsheet + 4 maps)
Village of Lost Souls	(Helpsheets)
Impact Jokes	(Lots of jokes)
Impact Jokes 2	(Lots more jokes)
Shark	(map)
[illegible]	(Solution + map)
Plan B	(Solution + map)
Zarch	(Helpsheet)
Stryker's Run	(Electron map)
Ziggy	(Solution + maps)
Future Shock	(Solution + map)
[illegible]	(Solution + map)
Return of R2	(Map + tips)
Bug Eyes 2	(Map)
Myorem	(Solution)
The Lost Crystal	(Solution + maps)
Imogen	(Solution + 15 maps)
Quest	(Solution + map)
Ravenskull	(Solution + 4 maps)
Last of the Free	(Solution + map)
[illegible]	(Helpsheet + map)
Confusion	(Solution)
Golden Figurine	(Solution + maps)
Enthar 7	(Solution)
Exile	(Helpsheet)
Terramex	(Solution)
The Hobbit	(Solution)
Citadel	(Solution + map)
Plan B2	(Solution + map)
Spy Vs Spy	(Helpsheet)
Spellbinder	(Solution + maps)
Elixir	(Solution + maps)
Paperboy	(Helpsheet)
Twin Kingdom Valley	(Solution + map)
Omega Orb	(Solution + map)
Elite	(Helpsheet + tips)
Tarzan	(Solution + map)
Branded	(Solution)
Codename : Droid	(Solution + map)
Thunderstruck	(Solution + map)
Suds	(Solution)
Philosopher's Quest	(Solution + map)
Rick Hanson	(Solution)
Thrust	(Maps)
Last Ninja	(Solution + maps)
Exile	(Helpsheet - Part 2)
Hoverbod	(Passwords + cheats)
Frak!	(Helpsheet)
Thunderstruck 2	(Solution + map)
Kourtyard	(Helpsheet + map)
Dunjunz	(Helpsheet + 25 maps)
Gisburnes Castle	(Solution + map)
Palace of Magic	(Solution + map)
Impact	(Helpsheets + passwords)
Icarus	(Helpsheet + maps)
Sphinx Adventure	(Solution + map)
Anarchy Zone	(Helpsheet + passwords)
Repton 2	(Helpsheet + 18 maps)
Bonecruncher	(All passwords + maps)
Skirmish	(Helpsheet)
Cholo	(Solution)
Quest for Freedom	(Solution + map)
Kayleth	(Solution)
Starquake	(Helpsheet)
Rick Hanson 2	(Solution)
The Hunt	(Solution)
Sabre Wulf	(Helpsheet + map)

WHITE MAGIC (The Fourth Dimension)

Following the immense success of Holed Out, The Fourth Dimension have now released a unique new fast-action arcade adventure called WHITE MAGIC. You can at any time transform into a Leprechaun, Enchanter, Titan or Warrior in order to use their much needed varied abilities. A sure-fire hit. For more details ring the Impact Newsline.

BBC/Electron Cassette £9.95 BBC B/Master 5 1/4" Disc £12.95

Enhanced Archimedes version available mid July at £19.95

ARCHIMEDES GAMES

White Magic (The 4th Dimension)	*19.95*
Holed Out (3D Golf) (The 4th Dimension)	*19.95*
Holed Out Extra Courses Vol 1	*16.95*
Holed Out Extra Courses Vol 2	*16.95*
Cheat It Again, Archie (Impact Software)	*9.95*
Quazer (Impact Software)	*9.95*
Startrader (Gem)	*16.95*
Word Up & Word Down (Gem)	*16.95*
Pacmania (Grandslam)	*15.95*
Repton 3 (Superior)	*15.45*
3D Pool (Firebird)	*16.95*
Jet Fighter (Minerva)	*11.95*
Corruption (Rainbird)	*19.95*
Fish (Rainbird)	*19.95*
Fireball (Godax)	*15.95*
Orion (Minerva)	*11.95*
Freddy's Folly (Minerva)	*11.95*
Alerion (Dabs Press)	*12.95*
Terramex (Grandslam)	*15.95*
Zarch (Superior)	*15.45*
Hoverbod (Minerva)	*11.95*
Missile Control (Minerva)	*11.95*
Thundermonk (Minerva)	*11.95*
Minotaur (Minerva)	*11.95*

HOLED OUT EXTRA COURSES

Due to overwhelming public demand The 4th Dimension has now produced 2 volumes of extra courses for their superb 3D golf game Holed Out. Each volume contains 2 brand new courses plus the original Holed Out program; therefore you do not need the original Holed Out in order to play them.

"I wouldn't have thought it possible to get a better simulation out of the beeb." *BBC Acorn User, June 1989.*
"The 3D perspective graphics are stunning" *Electron User GOLDEN GAME June '89*
"Holed Out is great.....The game plays very well and the graphics are superb." *Popular Computing Weekly, March 1989*
"The best golf simulation I've ever seen on any Acorn machine." *The Micro User, June 1989*
"The Electron version is brilliant - it's almost the same as playing at Gleneagles. Unreservedly recommended."
A & B Computing Game of the Month, June 1989

Prices above and opposite

M = Master Compatible

TITLE & PUBLISHER	BBC or Electron Cassette	BBC 5 1/4" Disc	Master Compact 3 1/2" Disc
IMPACT SOFTWARE (Discs are BBC B & Master Compatible 40/80)			
The Art Studio M	9.95	12.95	14.95
Orbital M	4.95	5.95	6.95
Clogger M	4.95	4.99	6.95
Zenon M	4.95	4.99	6.95
Cheat It Again, Joe 1	2.99	4.99	-
Cheat It Again, Joe 2	2.99	4.99	-
Cheat It Again, Joe 3	2.99	4.99	-
THE FOURTH DIMENSION			
Holed Out (3D Golf) M	9.95	11.95	12.95
Holed Out Extra Courses Vol 1 M	9.95	11.95	12.95
Holed Out Extra Courses Vol 2 M	9.95	11.95	12.95
White Magic M	9.95	12.95	13.95
SUPERIOR			
Play It Again Sam 8 M	6.90	-	-
Question of Sport M	9.50	11.50	15.70
Play It Again Sam 6 M	6.90	-	-
Last Ninja M (BBC Only)	6.90	-	11.25
Repton Infinity M	9.45	-	15.75
Play It Again Sam 5 M (BBC Only)	7.25	-	11.50
Exile M	9.45	11.45	15.75
By Fair Means or Foul M	6.90	8.90	11.25
Play it Again Sam 4 M	7.25	9.50	11.50
Play It Again Sam 3 M	6.90	8.90	11.25
Pipeline M	6.90	8.90	11.25
Repton Thru Time M	5.50	6.50	7.50
Barbarian M	6.90	8.90	11.25
Play it Again Sam 2 M	-	-	11.25
Bonecruncher M	6.90	-	11.25
The Life of Repton M	5.50	-	7.50
Elixir M	6.90	-	9.95
Repton Around the World M	5.50	6.50	7.50
Quest M	6.90	-	-
Elite M	9.45	11.45	15.75
Acornsoft Hits 1 M (BBC Only)	3.99	-	11.50
Acornsoft Hits 2 M	2.99	-	11.50
TYNESOFT			
Superman M	6.90	10.95	-
Circus Games M	6.90	10.95	-
Summer Olympiad M	6.90	11.25	11.25
Saigon M	7.25	-	-
Winter Olympiad '88 M	6.90	8.90	11.25
Spy vs Spy M	7.25	-	-
Indoor Sports M	7.50	11.95	-
Future Shock M	7.50	11.95	11.95
GODAX			
Skirmish M	4.95	6.95	6.95
Kourtyard M	5.95	6.95	6.95

TITLE & PUBLISHER	BBC or Electron Cassette	BBC 5 1/4" Disc
A + F		
Chuckie Egg	3.99	-
ACORNSOFT		
Aviator (BBC Only)	3.99	-
Revs & Revs 4 Tracks (BBC B Only)	3.99	-
Revs (BBC Only)	-	6.95
ASL		
Shark M	7.25	9.25
Breakthrough M	4.95	7.95
Impact M	7.25	9.50
Powerpack 2 (Elec Only)	5.95	-
Ransack M	7.50	9.50
Thunderstruck	4.95	-
Thunderstruck 2	4.95	-
Sphere of Destiny M	5.95	9.50
Omega Orb M	-	5.95
BEAU JOLLY		
Five Star Games 1 (5 games)	3.99	-
Five Star Games 2 (5 games)	3.99	-
Five Star Games 3 (7 games)	7.25	-
Computer Hits 2 (BBC Only) (10games)	3.99	-
Computer Hits 3 (10 games)	4.95	-
Computer Hits 4 (12 games)	7.25	-
Computer Hits 5 (5 games)	3.99	-
BUGBYTE		
Bugbyte Comp 1 (4 games) M	-	4.99
Bugbyte Comp 2 (4 games)	-	4.99
Dunjunz M	2.99	-
CDS		
Tank Attack M	9.95	11.95
Football Director M (BBC Only)	7.50	10.95
Colossus Bridge M	10.95	12.95
Colossus Chess M	7.50	12.95
Steve Davis Snooker M	1.99	4.99
Brian Clough Football M	5.95	7.95
DATABASE SOFTWARE		
Mini Office	4.95	-
Starquake (BBC Only) M	7.50	9.50
Mini Office 2 (BBC B Only)	12.95	14.95
Mini Office 2 (Master Disc)	-	15.95
Fun School 2 M:		
Under 6's M	7.50	9.95
6 to 8 Years M	7.50	9.95
Over 8's M	7.50	9.95
DOCTORSOFT		
Phantom Combat M	2.99	4.99
DOMARK		
Empire Strikes Back (BBC Only) M	6.90	9.70
Not a Penny More (BBC Only) M	6.95	6.95
Star Wars M	6.90	9.70
Return of the Jedi (BBC Only) M	6.90	9.70
Trivial Pusuits (All BBC Only) :-		
Genius Edition M	12.50	15.95
Baby Boomer M	12.95	16.95
Bulls Eye (BBC Only)	7.50	-
Countdown (BBC Only)	7.50	-
Blockbusters (BBC Only)	7.50	10.95
EPIC SOFTWARE		
The Lost Crystal (BBC Only)	8.95	-
ELK ADVENTURE CLUB		
Starship Quest	3.95	-
Magnetic Moon	3.95	-

TITLE & PUBLISHER	BBC or Electron Cassette	BBC 5 1/4" Disc
FIREBIRD		
Sentinel (BBC Only) M	7.25	9.50
Cholo (BBC Only) M	-	15.95
3D Pool	7.95	9.95
GREMLIN GRAPHICS		
Krakout (BBC Only) M	6.95	9.95
INCENTIVE		
Moon Cresta (BBC Only)	1.99	4.99
LOGOTRON		
Xor M	5.95	-
LOTHLORIAN		
Roundheads (BBC Only)M	-	9.95
MANDARIN		
Lancelot (80 Track Only BBC B with sideways/shadow RAM, B+, Master) M	-	11.95
Icarus M	7.50	9.95
Time and Magik (80 Track Only BBC B with sideways/shadow RAM, B+, Master) M	-	11.95
MARTECH		
Tarzan (BBC B Only)	-	4.99
War (BBC Only)	-	3.99
MASTER GAMES		
Scott Adams Scoops (BBC Only)	6.95	-
MICROPOWER		
Imogen M	7.25	9.50
Micropower Magic 1 (BBC Only)	4.95	-
Micropower Magic 2 (BBC Only)	4.95	-
Stockcar (BBC Only)	-	6.95
MIRRORSOFT		
Mastermind & Quizmaster	2.99	-
Tetris M	2.99	4.99
Spitfire '40 M	5.95	-
Strike Force Harrier	3.99	-
ROBICO		
Island of Xaan M	-	10.95
Rick Hanson Trilogy (BBC Only) M	17.95	-
Project Thesius M	8.95	11.95
Myorem M	-	10.95
The Hunt (BBC Only) M	7.95	-
U.S. GOLD		
Rebel Planet (BBC B Only)	4.95	-
Temple of Terror (BBC B Only)	4.95	-
WHITE PANTHER		
Infinity (BBC Only) M	7.50	11.95

THE 1989 BBC ACORN USER SHOW

Alexandra Palace, London
Stand No. 60

Come and meet us at this superb location for the show of the year. You'll be able to try some of the latest games and there'll be bargains galore on software and hardware. Ring our newsline for full details.

21st to 23rd JULY

The Art Studio

from Impact Software

from only £9.95

An ingenious and comprehensive design program from Impact Software allowing you to create superb pictures and save them to cassette or disc. It features a host of easy to use commands such as Zoom, Paint, Fill, Copy etc, to help any budding artist. No roms, chips, mice or other add-ons are required. Just load and go! Keyboard or joystick controls. Works in modes 4 & 5. This must be the best value utility on the market today.

Prices opposite

BUDGET TITLES

BBC B or Electron Cassettes

ALL ONLY £1.99 EACH

- Alien Dropout
- Anarchy Zone
- Bar Billiards
- Blitzkrieg (Elec only)
- Boxer (Elec only)
- Chess (Elec only)
- Creepy Cave
- 3D Dotty
- 3D Maze (Elec only)
- Darts
- Deathstar
- Flight Path 737 (Elec only)
- Frankenstein 2000
- Gisburnes Castle
- Golden Figurine
- Golf
- Graham Gooch Cricket (Elec only)
- Grid Iron
- Gunsmoke (Elec only)
- Hyperdrive (Elec only)
- Indoor Soccer (Elec only)
- Invaders (Elec only)
- Jetpac (BBC only)
- Joe Blade 1
- Joe Blade 2
- Last of the Free
- Magic Mushrooms (BBC only)
- Monkey Nuts
- Moon Cresta (BBC only)
- Mr Wiz
- Nuts (BBC only)
- Panic
- Pegleg (Elec only)
- Percy Penguin
- Peter Scott Trilogy (BBC only)
- Psycastria
- Round Ones
- Smash and Grab
- Snapper (Elec only)
- Snooker (BBC only)
- Soccer Boss
- Starship Command (Elec only)
- Steve Davis Snooker
- Stormcycle
- Styx
- Superpool (Elec only)
- Swoop
- Tempest
- Thai Boxing (Elec Only)
- Triple Deckers 1 - 10 (1.99 each)
- UK PM (Elec only)
- Video Card Arcade
- Video Pinball
- Wet Zone (Elec only)

ALL ONLY £2.99 EACH

- Acornsoft Hits 2
- Arcadians (Elec only)
- Beachhead (BBC only)
- Citadel
- Commando
- Crazee Rider
- Cricket
- Croaker
- Drogna (BBC only)
- Dunjunz
- Felix in the Factory
- Felix / Fruit Monsters (Elec only)
- Football Manager
- Footballer of the Year
- Frenzy (Elec only)
- Galaforce
- Ghouls
- Hopper (Elec only)
- Hunkidory
- Karate Combat
- League Challenge
- Megarock (BBC only)
- Meteors (BBC only)
- Mr Ee (BBC only)
- Phantom Combat
- Plan B
- Plan B2
- Pro Golf
- Ravenskull
- Repton
- Repton 2
- [illegible]
- Rocket Raid (BBC only)
- Sphinx Adventure (Elec only)
- Squeakaliser
- Star Force Seven
- Strykers Run
- Survivors
- Syncron
- Tennis
- Thrust
- Turf Form
- Twin Kingdom Valley
- Uranians
- Warehouse

IMPACT NEWSLINE

For the very latest news ring: 0898 654334

25p per minute cheap rate; 38p all other times
(if you are using your parents phone please ask for their permission first)

Now updated every week, the newsline is a superb way of keeping up to date with the latest releases, games news, bargains and the top 5 best-selling games of the week.

SIMPLY FILL IN THIS COUPON AND SEND A CHEQUE OR POSTAL ORDER TO IMPACT SOFTWARE.

- All games despatched by 1st class post.
- **FREE** postage and packing (U.K only).
- Despatch normally same day as order.
- Minimum orders £3.00.
- Telephone orders welcome.

TELEPHONE ORDERS WELCOME
24 HOUR SERVICE 7 DAYS A WEEK

VISA

(0742) 769950

Impact Software
Neepsend House
1 Percy St
Sheffield S3 8AU

To: Impact Software, Neepsend House, 1 Percy St, Sheffield, S3 8AU
Please send me the following :-

TITLE	FORMAT (Cassette etc.)	COMPUTER	PRICE
....	....	....	....
....	....	....	....
....	....	....	....
....	....	....	....
....	....	....	....
....	....	....	....

(We cannot accept orders for less than £3.00)

TOTAL COST....... £

* **I enclose a cheque/P.O. or :**
* **Debit my Access/Visa card account :**

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

(BLOCK CAPITALS PLEASE)

Name.......................................

Address.......................................

....

....

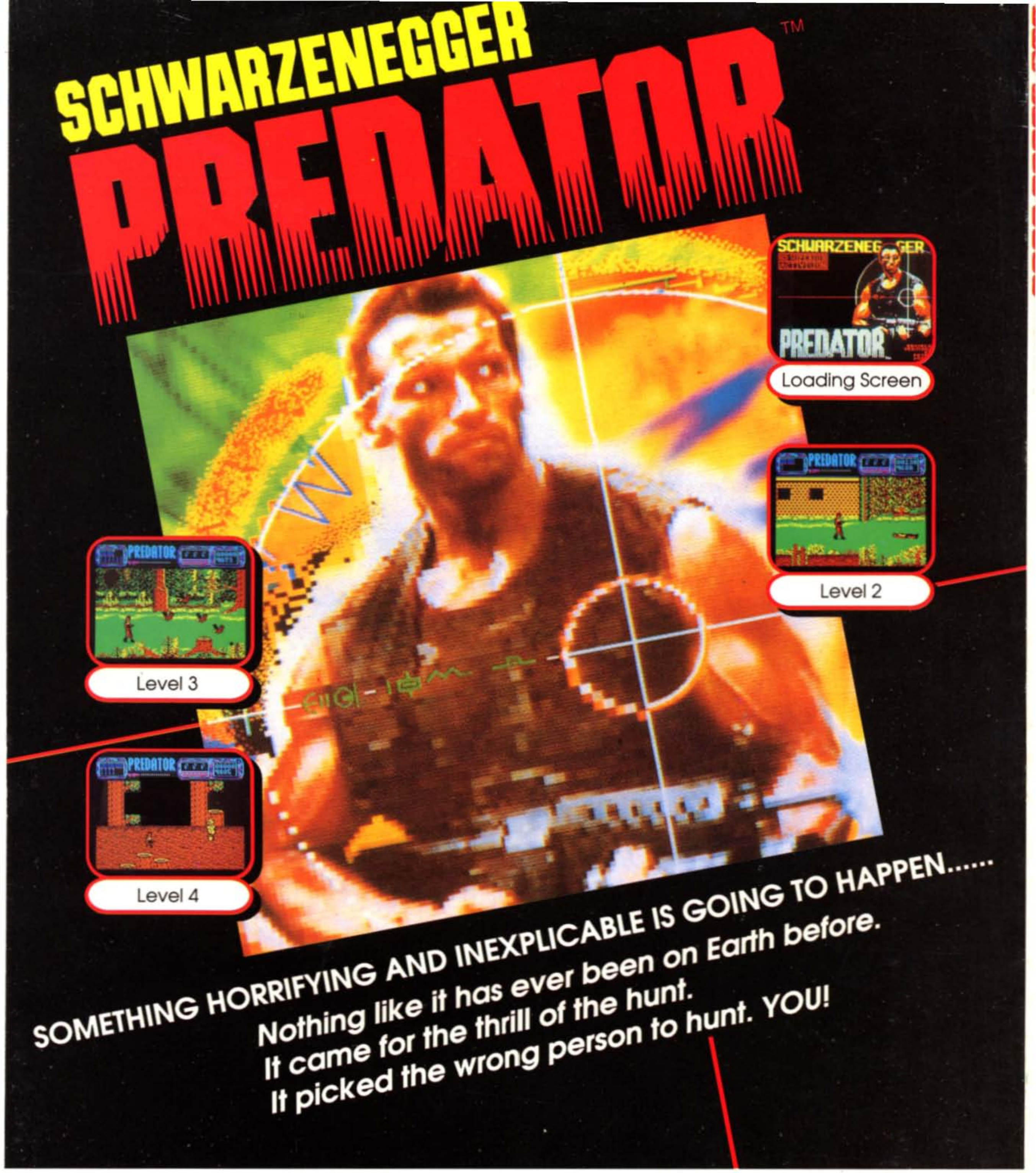
....

Postcode.......................................

Please send me **FREE** helpsheets/solutions/maps for the following games (from those above)

1.......................................(Orders over £4)

2.......................................(Orders over £10)


SCHWARZENEGGER
PREDATOR™
SCHWARZENEGGER PREDATOR
Loading Screen
PREDATOR
Level 2
PREDATOR
Level 3
PREDATOR
Level 4
SOMETHING HORRIFYING AND INEXPLICABLE IS GOING TO HAPPEN......
Nothing like it has ever been on Earth before.
It came for the thrill of the hunt.
It picked the wrong person to hunt. YOU!

BBC Micro Cassette	£9.95	Acorn Electron Cassette	£9.95
BBC Micro 5¼" Disc	£11.95	BBC Master Compact 3½" Disc	£14.95

(Compatible with the BBC B, B+ and Master Series computers)

Please make cheques payable to "Superior Software Ltd".

(The screen pictures show the BBC Micro version of the game.)

You've heard about PREDATOR, the Schwarzenegger film – now you can play the leading role. Take a crack commando unit into the South American jungle to rescue a bunch of trapped diplomats. Should be easy enough...so it would be, if it weren't for the mysterious alien who keeps on taking out your men. All the thrills and action have been captured by brilliant programming, using features such as parallax scrolling and dual-screen updating.

Nothing like it has ever been seen before!

SUPERIOR SOFTWARE Limited

ACORNSOFT

(Acornsoft is a registered trademark of Acorn Computers Ltd. Superior Software Ltd is a registered user.)

Dept PR1, Regent House, Skinner Lane, Leeds LS7 1AX. Telephone:(0532) 459453

ACTIVISION

©1987 Twentieth Century Fox Film Corp.
Licenced from Activision (UK) Ltd.

Available from WHSMITH and all major dealers

24 HOUR TELEPHONE ANSWERING SERVICE FOR ORDERS

OUR GUARANTEE

- All mail orders are despatched within 24 hours by first-class post.
- Postage and packing is free.
- Faulty cassettes and discs will be replaced immediately.

(This does not affect your statutory rights)